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ADDRESSES AND ORIGINAL ARTICLES

POSTURAL DEFORMITIES OF THE ANTEROPOSTERIOR CURVES OF THE SPINE *

BY PHILIP WILES, M.S. Lond., F.R.C.S. Eng.
ASSISTANT ORTHOPÆDIC SURGEON TO THE MIDDLESEX HOSPITAL, LONDON

THE generally accepted views of the physiology of the neuromuscular system, so far as they concern posture, have undergone considerable modification of recent years. Before discussing them, however, it is necessary to emphasise a fact that should be a commonplace—the ligaments play no part at all in the normal regulation of posture. Over a hundred years ago Delpech (1828), a French orthopædist, drew attention to this fact, but its general acceptance has been very slow. The function of ligaments is to limit the extremes of movement, and no loss of stability need occur when they are absent, as may be seen after complete excision of the capsule of the hip-joint.

The function of skeletal muscles is to cause movement and to maintain posture, but an individual muscle-fibre is capable only of one thing, the development within itself of a state of tension. Its behaviour when the tension develops depends on conditions external to itself. If there is no resistance to its movement, the fibre contracts. If there is resistance which it is unable to overcome, movement is absent, or minimal, and the contraction is said to be "isometric." The former process is used in making movements, the latter in maintaining posture. Individual fibres appear to follow the "all or none" law, so the power exerted by a whole muscle is proportional to the number of fibres in action. This in turn depends on the external resistance to be overcome and the rapidity of the movement; consequently for the maintenance of posture the number of fibres required at once may be very small.

Each muscle-fibre, or small group of fibres, is separately supplied by motor nerves which can transmit impulses of only one type and in one direction. For the purpose of maintaining posture, muscular power, and therefore the number of fibres in use at once, is comparatively small, so that continual change of contracting fibres can occur, and fatigue is reduced to a minimum. This is clearly shown in records of the action currents which are produced during the active contraction of a muscle. A fine double electrode is inserted into the substance of the muscle; the current is amplified, made visible by means of a cathode ray oscillograph, and photographed on a moving film. The currents are of a moderately small order, and only such as are produced by muscle-fibres in the immediate neighbourhood of the electrode are detected. Dr. C. A. Keele, of the department of physiology at the Middlesex Hospital Medical School, has been kind enough to assemble the apparatus and coöperate in making a number of observations.

In Fig. 1 are records of action currents in the central portion of the gluteus medius. When the leg was supported so that the muscle was completely relaxed action currents were absent, or only occasionally recorded (above). When the subject was standing with both feet on the ground so that the muscle was engaged in maintaining normal upright posture, contractions were fairly frequent but not absolutely regular (middle). During active muscular contraction, violent activity is recorded (below).

The process of maintaining posture requires the balanced contraction of the muscles on each side of the joint concerned—that is, in the upright position, nearly every joint in the body. The regulation of this complicated process is entirely a function of the central nervous system. It is brought about mainly

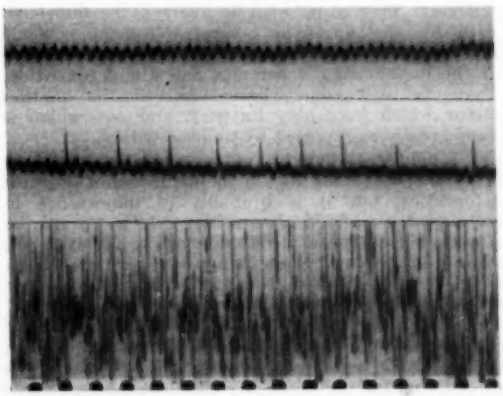

FIG. 1.—Action currents of central portion of gluteus medius. Above: leg supported and muscle fully relaxed. Middle: standing still with legs 6 in. apart. Below: standing on one leg.

by means of unconscious reflexes which coördinate afferent impulses from the muscles, joints, eyes, ears, and skin.

A permanent change in habitual posture is *not* maintained by the muscles on one side of the joints concerned contracting more strongly whilst those on the other side are more relaxed. This process only causes the movement by which the new posture is reached. Once it is reached, all that is necessary to maintain it is a change in the length at which the muscles must remain, and the power required may be no greater than before. To keep the muscles habitually at this changed length is obviously a function of the central nervous system and involves the conditioning of a new reflex which regards a new muscle length as normal.

The requirements for a good posture in an otherwise healthy body are adequate muscles and correctly conditioned reflexes. The muscular power required to maintain posture is so small that it is unusual for muscular weakness alone to be the cause of postural deficiency. In a large proportion of cases the error lies in the postural reflexes, and it is to this that attention has chiefly to be directed. It is perhaps permissible to compare the state of affairs to that in a pianola. When a record of a given pattern is passed through the instrument, a particular tune is played, but it is subject to the conscious modulations of the player by means of the speed and volume controls. Any fault in the record will be reflected in the tune and can be remedied only by altering the record; conditions in the body are much the same. Temporary modification of posture can be obtained by conscious control, but any permanent change must be associated with an alteration in the postural reflexes; increasing the size and power of the muscles alone will have no effect.

* A Hunterian lecture delivered before the Royal College of Surgeons of England on April 12th.

Ætiology

The causes which lead to the development of faulty postural reflexes, or to a change from good to faulty reflexes, are little understood. There must be many factors concerned, more than one of which are likely to be present in any case.

A great number of postural deformities commence in late childhood and adolescence, during periods of rapid growth. The bones and muscles are then increasing in length and the central nervous system is continually being called upon to modify its postural reflexes. This adjustment is likely to be interfered with by any upset in general well-being. There are many ways in which this can be brought about; at the present time a common one is undernutrition. Toxæmia from some chronic infection is another factor which may play its part, and one which is itself greatly aggravated by undernutrition.

It is doubtful if heredity is concerned in the ætiology of those cases falling within the definition of postural deformities, but it is probably of importance in certain of the fixed deformities which cannot be corrected by voluntary muscular effort, for example, those "malignant" cases of pes cavus or of scoliosis which tend to recur or to progress in spite of every treatment.

It has been the custom of surgeons for many years to blame the immediate surroundings of the patient, such as vicious school furniture and types of clothing, for the onset of some deformities. Some have even gone so far as to suggest that "one-sided" occupations, like violin-playing and the use of a side-saddle in horse-riding, are sometimes responsible for scoliosis! No logical explanation of the mode of action of such mechanical factors has been brought forward and it is difficult to believe that they are of any great importance. A child who is determined to sit badly will do so at any desk—it would be far more rational to blame a boring lesson that fails to hold his attention.

A normal posture can only be assumed when the higher parts of the brain are intact, so it is reasonable to suppose that any disturbance in the normal functioning of the brain can interfere with the development of postural reflexes. It is obvious that posture is subject to conscious modification, and, by analogy, it might be expected to be influenced by unconscious cerebral processes. There is a growing tendency to explore the psychogenic factors underlying disease processes of many sorts. The investigation of this subject is fraught with the greatest difficulties, and there are many pitfalls in the way of the interpretation of any findings. Sometimes, however, it does seem possible to make a direct correlation between the psychopathological findings and the physical condition, and certain cases of postural deformity provide excellent examples.

Bankart has said "to diagnose a scoliosis, look at the child's back; to find its cause, look at the mother's face." The general truth of this observation is apparent to everyone, and, moreover, it is quite rational to expect that any psychological maladjustment will be reflected in the postural habits. The most extreme case of the association of an abnormal psychological state with an abnormal posture is seen in "neurasthenia," using the word in its narrow sense of a particular functional nervous disorder. It occurs in both adults and children, and the picture is very distinctive. The patient is flabby in both body and mind. Mentally he is tired, bodily he has given way to gravity and has sagging jaw and eyelids, tilted pelvis, and flat feet. The mental and physical conditions go together and any attempt to change the physical condition, until such time as the psychological adjustment has been improved, usually leads to disappointment.

Other but less clearly defined groups are to be found amongst children and adolescents. In the "anxiety states" the general picture is of a hypersensitive, alarmed child, not infrequently subject to nightmares and often with a stammer. Physically he tends to have flat feet, knock-knees, and round shoulders, a position of fear; but, in contrast to the "neurasthenic," his muscles are tense rather than slack. Again, the "obsessional" child may show queer habits of gait and posture, often asymmetrical, which are impossible to explain except in association with the psychological condition.

To sum up, there are a number of factors concerned in the ætiology of postural deformities. The most important are undernutrition, rapid growth, and psychological maladjustment. Undernutrition alone may provide sufficient cause by undermining the general health, both physical and mental. In other cases it develops during a period of rapid growth in people who are emotionally disturbed, and consequently are unable to make satisfactorily the adjustments in their postural reflexes that are necessary to meet the needs of growth. In a further class, exemplified by the "neurasthenics," the psychological attitude is directly reflected in the posture. I do not maintain that nearly everybody with a postural deformity is a "neurotic." I suggest rather that, in far more cases than is usually suspected, there is some psychological maladjustment that interferes with the development of correct reflex postural habits. The maladjustment is often only temporary, and, when it has corrected itself, the postural habits also are readily corrected.

Pelvic Inclination

Deviation of the curves of the spine from what has come to be regarded as normal is of more than cosmetic importance. It reduces the mechanical efficiency of the back so that it is more readily fatigued and more liable to strain. It is therefore important to have accurate knowledge of the normal arrangement, and some method of mensuration more accurate than the usual one of judging by eye is desirable. Direct measurements have proved notoriously unsatisfactory because of the difference in the thickness of the fleshy and fatty coverings and of the actual lengths of the spinous processes. The ideal method of measurement would be to take radiograms of the standing patient with a tube at 6 ft. and a plate large enough to cover the pelvis and most of the spine. A suitable X ray apparatus is in existence, but, as it is not available in this country even for research work, the method is at present of no value for routine use.

Since it is impracticable to measure the spinal curves directly, attention has been turned to an indirect method. The spine is attached to the pelvis at the lumbosacral junction, so that any movement of the pelvis will cause a corresponding movement of the fifth lumbar vertebra. The habitual posture of the pelvis therefore determines that of the fifth lumbar vertebra, which in turn must affect the posture of the whole lumbar spine. Hence measurement of the inclination of the pelvis should give an estimation of the curve of the lumbar spine.

The inclination of the pelvis has never been measured satisfactorily in the living subject. Reynolds and Lovett (1910) say they believe it to be impossible to measure its variations with sufficient accuracy

to be of value, but they give no indication of the methods they have tried. Most estimations have been on the cadaver, but several workers, notably Prochownick (1882), have attempted it on the living subject by rather elaborate means.

I have devised a simple method of measuring the pelvic inclination, which I believe is of sufficient accuracy. Measurements of the inclination of a fixed object give readings accurate to 1° with different observers. Repeated measurements of the pelvis of the same people on different occasions gave a variation of + or − 2°. This wider variation is accounted for by a slight difference in posture on the different occasions, and it is not present if the person stands still whilst several observations are made.

The instrument (Fig. 2) has been made for me by Messrs. Down Bros., Ltd. It consists essentially of a pair of external callipers with a vertical plate fixed at the hinged end in such a way that it is always in a plane at right angles to the plane of bisection of the callipers. The plate is graduated in degrees, and a plumb-line suspended so that the inclination to the horizontal can be read directly from the scale.

The points taken for measurement are the upper border of the symphysis pubis in front, and the level of the posterior-superior spines behind. This posterior level was chosen, rather than the fifth lumbar spine,

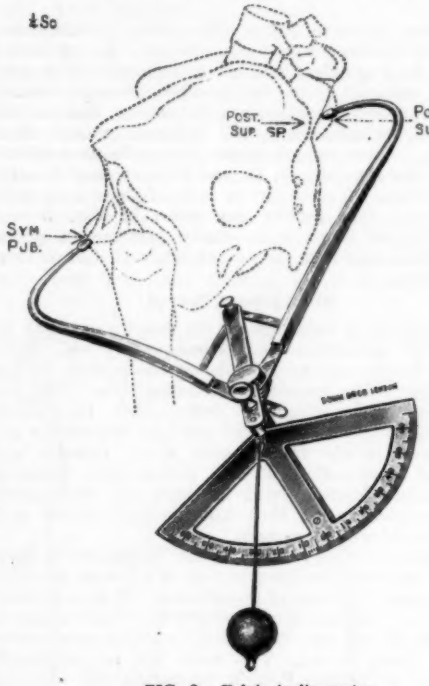

FIG. 2.—Pelvic inclinometer.

because the latter is much broader and often difficult to palpate accurately. No mention of posture is made to the subject unless the one adopted is obviously forced. The posterior-superior spines are palpated and a pencil mark made on the skin at this level in the midline. The blades of the callipers are held one in each hand with much the same sort of grip as a pencil is held when writing. The upper border of the symphysis is palpated with the middle finger of the right hand, and the point of the right blade adjusted to touch this point. The left blade is placed on the mark already made posteriorly. Finally, the graduated plate is made parallel with the plumb-line and therefore vertical, and a reading is made.

Lovett (1931) quotes the figures for the pelvic inclination obtained by various investigators in the last century as ranging from 41° to 65°. He says that all the figures are adjusted to give the inclination of the true conjugate of the pelvis, which he defines as the line joining the lumbosacral junction to the upper border of the symphysis. However, Ten Teachers' Midwifery (1935) defines the true conjugate as the line joining the centre of the promontory of the sacrum to the nearest point on the surface of the symphysis. The planes in which these two lines lie differ by some 10°, so it is difficult to use Lovett's figures as a basis for comparison. Prochownick (1882) has adjusted his figures to give the inclination of the plane of the "pelvic inlet" and this differs from both the above planes.

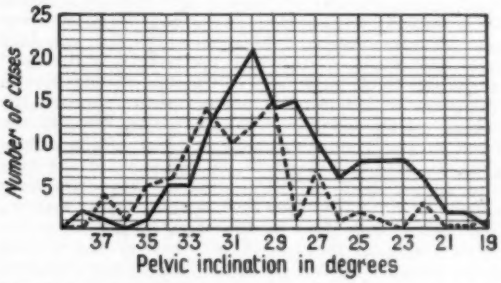

FIG. 3.—Pelvic inclination of adults. Males (interrupted line) average 31°. Females ((continuous line) average 28°.

The older workers were interested in the inclination of the pelvis from the point of view of the mechanics of parturition. Since this is not now the only interest, and since the inclination of the true conjugate can only be measured directly by radiography, I suggest that this plane should no longer be used as the standard. Subsequent mention in this paper of the inclination of the pelvis will refer to the angle between the horizontal plane and the plane of the lines joining the posterior-superior spines to the symphysis pubis.

The pelvic inclination has been measured in a consecutive series of "normal" adults. The women were mostly nurses and massage students, aged 18 to 30 (average 21). The men were from a Y.M.C.A. training class, and medical students, aged 17 to 50 (average 23). The figures are given in the Table and the frequency with which the various inclinations occurred is shown in graphic form in Fig. 3.

Table showing Pelvic Inclination

	Average.	Range.
93 men	31°	37°–19°
137 women	28°	38°–18°

It was necessary to discover to what extent the shape of the lumbar spine would correlate with the pelvic inclination. With this in view, a note was made in every case of the appearance of the back, as judged by eye, and of the degree of lordosis, so far as it could be measured. This was done by dropping a plumb-line from the most prominent vertebra, and measuring the distance in inches from the plumb-line to the sacrum and the point of maximum lumbar convexity.

It was found that these measurements were almost useless as a guide to the shape of the spine. The appearance, however, was of much greater value and correlated well with the pelvic measurement.

The normal curves of the spine must vary a certain amount from individual to individual, and it is very difficult to define them. Moreover, if a person is leading an ordinary life and is free from symptoms, it is difficult to say that any small deviation from an arbitrary standard is abnormal. The standard here adopted is one in which the body is well "set" as judged by the eye, and in which a vertical line in the plane of the mastoid process passes through the middle of the shoulder- and hip-joints, towards the front of the knees, and well in front of the ankles (Fig. 4). By this standard, 56 per cent. of the men and 46 per cent. of the women in this series were classed as having normal curves and normal posture. The pelvic inclination in the men ranged from 34° to 26°, with an average of 31°, and in the women from 33° to 23°, average 29°. Individuals classified as having a lumbar lordosis invariably had an increased pelvic inclination, and those with a flattened lumbar spine had a decreased inclination. A change in inclination also occurred in those who leant backwards or forwards at the hips and yet had normally curved spines, and in certain other abnormalities of posture. This will be discussed more fully under types of postural deformity.

It is usually said that the posture and spinal curves vary with the type of body build. With a view to studying this point, the type of each person examined was recorded. The classification used was normal, sthenic, asthenic, and dysplastic. The standard of normal was again an arbitrary one and really amounted to the mean between sthenic and asthenic. Individuals with a sthenic lower body and asthenic thorax, or vice versa, were described as dysplastic. These types have been carefully correlated with the rest of the data. No particular type of posture or spinal curves could be found corresponding to the body types. The average angle of pelvic inclination of each type closely approximated to the general average.

FIG. 4.—Normal posture. A line has been drawn through the mastoid process parallel to a plumb-line included in the original photograph.

The pelvic inclination is rather smaller in the early years of life than in the adult. This is as might be expected during development from the flexed intra-uterine position to an upright posture. An attempt has been made to follow this change statistically, but difficulties were experienced in obtaining access to a sufficient number of children. The education committee of the London County Council kindly gave me permission to attend the routine medical examinations of children under their control. These examinations are made at approximately the ages of 4, 7, 11, and 13 years, and twenty-five children of each sex at each of these ages were measured. The results are given in Fig. 5 and suggest that there is a steady increase in pelvic inclination up to the age of 11 when the adult level is reached.

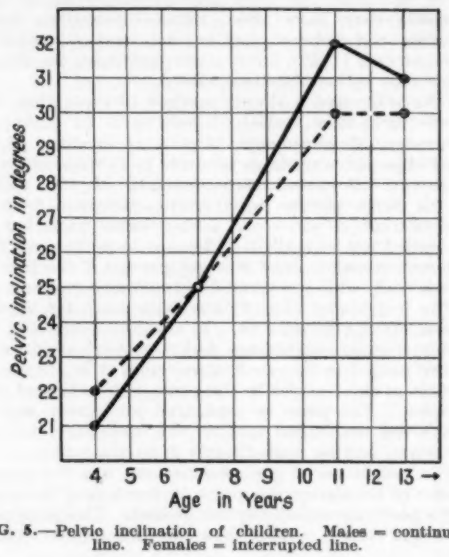

FIG. 5.—Pelvic inclination of children. Males = continuous line. Females = interrupted line.

Muscular Control

The pelvis is balanced on the femora, so that its angle of inclination (and consequently the curve of the lumbar spine) depends on the posture of the hip-joints. The muscles controlling the hips are therefore responsible for determining the pelvic inclination. In the upright position the thighs are the fixed points from which these muscles act so that contraction of the flexors (the iliopsoas and rectus femoris) will increase the inclination, and contraction of the extensors (the glutei and hamstrings) will decrease it.

Investigation of muscle action by means of their action currents has brought out two points concerning the glutei that are of importance. It is commonly stated—e.g., Quain's Anatomy (1923)—that the *gluteus maximus* is not used in ordinary walking movements to any great extent. This could not be confirmed. The muscle participated in producing full external rotation of the hip and in every movement involving extension, including tilting backwards the pelvis. The *glutei medius et minimus* are primarily abductors of the hip but they are also extensors and, by their central and posterior portions, they are external rotators.

The three glutei function in life as one unit and as part of the extensor group of muscles that maintain the upright position. Their combined action on the hip can produce extension, abduction, and external rotation; but the thigh or pelvis is moved according to which is the fixed point. Postural increase in the

lengths of these muscles will therefore result in forward tilting of the pelvis and internal rotation of the legs. The latter is of considerable importance in the ætiology of flat feet.

The action of the *rectus abdominis* is often misunderstood because it can be seen to contract synergically with the glutei when the lumbar spine is flattened. From this it is often argued that the rectus, and not the glutei, is tilting the pelvis backwards, and consequently remedial workers pay great attention to it in cases of lordosis. However, such an action is impossible because there is no fixed point above from which it can pull.

If the rectus abdominis could be made to contract alone, it would clearly approximate the sternum to the symphysis pubis and flex the lumbar spine. The part of the body actually moved would depend on which was the fixed point; either the pelvis would be tipped backwards or else the thorax bent forwards. When standing upright the thorax is the least fixed and must therefore be the part to move. If it were desired to fix the thorax and move the pelvis, the only muscles that could do so would be the erector spinæ; but consider what must happen if the rectus and the erector spinæ contract together. These muscles are bridging the gap between two bony boxes which are joined by a curved flexible rod. Their simultaneous contraction can have only one effect, to move the thorax bodily nearer to the pelvis and *increase* the lumbar curve (Fig. 6). The rectus abdominis can therefore have little effect on the inclination of the pelvis when standing erect. Its action (in addition to that of retaining the abdominal contents) is to flex the lumbar spine.

The *erector spinæ* control extension of the spine. The range of movement is largest in the lumbar region, where there is a large and powerful mass of muscle to raise the trunk from the flexed position. In the dorsal region the range of movement is very much smaller; the erector spinæ is much less powerful, but there are other muscles which assist it. The dorsal curve is flattened appreciably with every inspiration, and for this the muscles of respiration—the diaphragm, intercostals, &c.—are largely responsible. These muscles must therefore coöperate

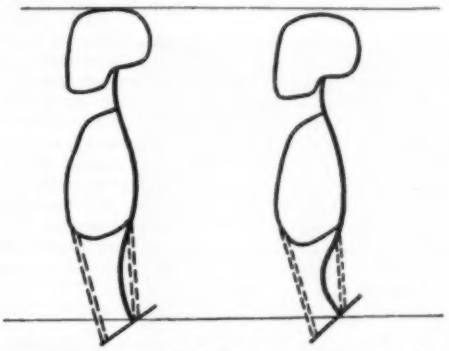

FIG. 6.—Simultaneous contraction of the rectus abdominis and the erector spinæ must increase the pelvic inclination.

in maintaining normal posture, and also in recovering from a "slack" position, in which there is a slight increase in the dorsal curve, to a good posture.

The weakest part of the extensor mechanism of the spine is in the upper lumbar and lower dorsal regions. The mass of the erector spinæ is getting smaller, and the change of curve from concave to convex is taking place, making it mechanically a vulnerable spot. Loss of tone in the extensors will allow the whole weight of the upper part of the body to come on to the spine and produce one of the commonest deformities, a dorsolumbar kyphosis (Fig. 10). In the early stages the deformity can be straightened by the action of the erector spinæ. Later on, however, it seems that the ligaments become contracted, and sometimes the vertebræ become wedge-shaped, so that active correction is no longer possible.

To summarise—the inclination of the pelvis is controlled almost entirely by the muscles surrounding the hip-joints. The abdominal and spinal muscles have little direct effect on the pelvis; their action is to keep the body upright, whatever the pelvic inclination, by varying the curves of the spine.

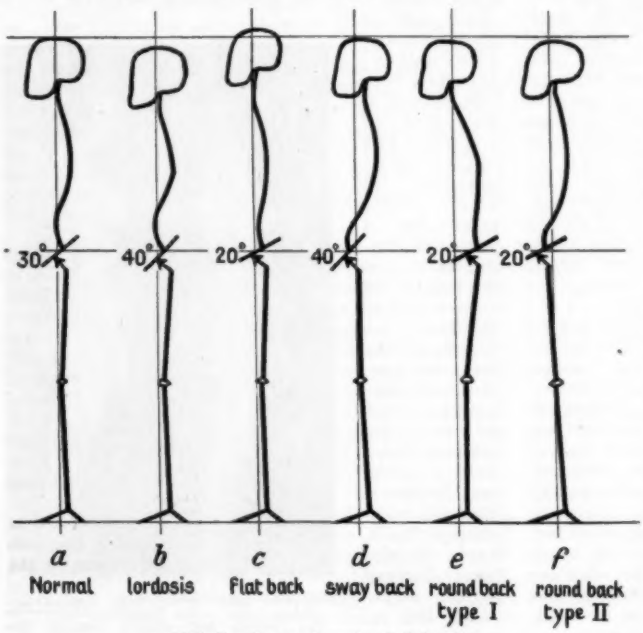

FIG. 7.—Types of postural deformity.

TYPES OF DEFORMITY

It is essential for the maintenance of the upright position, whatever abnormality of posture may be present, that the centre of gravity of the whole body should fall somewhere within the area occupied by the feet. This limits considerably the possibilities of postural variation, and analysis shows that only two components contribute to make up the majority of cases. Firstly, there is nearly always an alteration in the pelvic inclination, which may be increased or decreased. Secondly, there may, in addition, be a dorsolumbar kyphosis. These two variables combine to produce four distinct groups which are adequate to classify the majority of cases. (In the following, "normal spine" means one which has no

intrinsic error and whose curves become normal when the pelvic inclination is corrected.)

Forward tilt of pelvis plus	normal spine	lumbar lordosis.
	dorsolumbar kyphosis ..	sway back
Backward tilt of pelvis plus	normal spine	flat back.
	dorsolumbar kyphosis ..	round back.

In the ensuing account of the types of postural deformity the pelvis is taken as the starting-point for description, not because it is necessarily the causal factor, but because it is the base on which the column of the spine is supported. The problem then becomes largely the mechanical one of explaining how the centre of gravity is adjusted (Fig. 7). A theoretical explanation of the production of the deformities is given for the sake of convenience, but it is not suggested that it is the actual manner in which they arise during life. The process is one of gradual "slumping," rather than of separated movements.

LUMBAR LORDOSIS

The mechanism of the production of lordosis can be visualised as follows. First the pelvis is allowed to tilt forwards, and with it the whole trunk. Then the centre of gravity is restored by bending backwards in the lumbar region and increasing the concavity (Figs. 7*b* and 8). The mastoid line bears much the same relation to the large joints in the corrected and uncorrected positions. The spine is pretty well balanced, so the erector spinæ have little work to do and can share in a general slump of the anti-gravity muscles, thus permitting a slight increase in the dorsal curve.

The condition is often referred to as kypho-lordosis, but the increase in the dorsal curve is slight and unimportant. The dorsolumbar curves in the corrected and uncorrected positions were recorded in a number of cases with malleable metal strips. The strips were then outlined on papers which could be superimposed to show the amount of change. The change is surprisingly small in the dorsal region, and the kyphotic appearance of the dorsal spine in such cases is partly due to the exaggerated curves above and below. Tracings of photographic reductions are shown in Fig. 9.

FIG. 8.—Left: lordosis. Right: corrected by decreasing the pelvic inclination.

Internally rotated legs and valgus feet are very commonly present in cases of lordosis, as in all other deformities in which there is an increased pelvic inclination. The feet can only be corrected after the general posture and the rotation of the femora has been altered (Wiles 1934).

The pelvic inclination has been measured in 24 female patients undergoing treatment for lordosis. The average angle was 39°, with a range of 34° to 41° (average for normal women 28°).

FIG. 9.—Showing the small change in the curve of the dorsal spine in two cases of lumbar lordosis (see text).

The clinical picture in a typical case is one of a forward tilted pelvis, increased lumbar and dorsal curves, shoulders drooping and head poked forwards, internally rotated legs and valgus feet. The dominating feature, however, is the pelvis; the rest of the deformities are secondary to it. This has often been demonstrated when examining untreated cases. The patient has been shown how to use the glutei to restore the pelvic inclination to normal and the posture of the trunk has at once returned almost to normal.

Treatment, so far as it is local at all, should be directed chiefly to the glutei. To concentrate on the abdominals, as some workers tend to, can achieve little by itself because these muscles play only a secondary part in this deformity.

SWAY BACK

This name originated in America for a postural type which seems to be very common there. Analysis along the lines already indicated shows it to consist of a forward tilted pelvis in association with a dorso-lumbar kyphosis. The degree of kyphosis is often quite small, really no more than a flattening of the upper part of the lumbar concavity. However, even this amount is sufficient to prevent the spine compensating to the tilted pelvis by a general increase in the curve of the lumbar region, as occurs in the previous type. Instead, the centre of gravity is restored to a stable position by bending the spine sharply backwards in the lower lumbar region (Figs. 7*d* and 10). In this position,

FIG. 10.—Left: sway back. Right: decreasing the pelvic inclination improves the posture but cannot remove the dorsolumbar kyphosis.

FIG. 11.—Left: round back, Type 1. Right: the pelvic inclination is increased but the back is still abnormal.

the legs are inclined slightly forwards at the ankles so that the pelvis projects forwards. The mastoid line passes well behind the great trochanters and a plumb-line from the most prominent part of the dorsal convexity falls behind the sacrum. Internally rotated legs and valgus feet are commonly present, and not infrequently there is a total scoliosis as well.

In the cases examined, the average inclination of the pelvis was 37°, the range being 35°–41°.

The dorso-lumbar region of the spine is only occasionally sufficiently mobile to allow active correction by the erector spinæ. As a rule, there is such limitation of movement that the deformity is not even corrected when a wedge is placed under the upper lumbar spine and the patient lies limply across it. The limitation of movement is sometimes due to structural changes in the vertebræ, which can then be shown by X rays to be wedge-shaped.

From the point of view of treatment, sway back differs from simple lordosis in that correction of the pelvic angle does not enable the spinal curves to be restored to normal. Treatment has therefore to be directed at first to increasing the mobility of the spine—one of the most difficult problems of postural correction.

FLAT BACK

Flat back is just as much a postural deformity as any of the other conditions discussed. The pelvis is abnormally flat and the spine is flattened in compensation. Such cases, however, are seldom, if ever, sent to orthopædic departments on account of their posture, and adolescent patients are rarely seen in remedial clinics undergoing treatment for flat back. People with flat back come under orthopædic observation later in life complaining of backache, sacro-iliac strain, or other troubles of a mechanical nature. By this time the spine is too stiff for any change of posture to be possible, and only symptomatic treatment can be given. A great many of these complaints could be prevented if only parents and school medical officers could be brought to realise that a "lovely straight back" is not necessarily ideal and could be persuaded to send such cases for treatment during childhood.

ROUND BACK

This name has been adopted for a rather less clearly defined group of cases in which a decreased pelvic inclination is associated with a dorsolumbar kyphosis. The centre of gravity is stabilised by mechanisms of two different types. In type 1, which gives the name to the group, the trunk is bent forwards in the lower lumbar region obliterating what is left of the lumbar curve. The legs are inclined slightly backwards at the ankles so that the pelvis is displaced relatively backwards and the great trochanter is behind the mastoid line (Figs. 7*e* and 11). The mechanism in type 2 is very similar to that in sway back. The legs are inclined forwards and the trunk backwards causing a lower lumbar angulation; the great trochanter is in front of the mastoid line (Figs. 7*f* and 12).

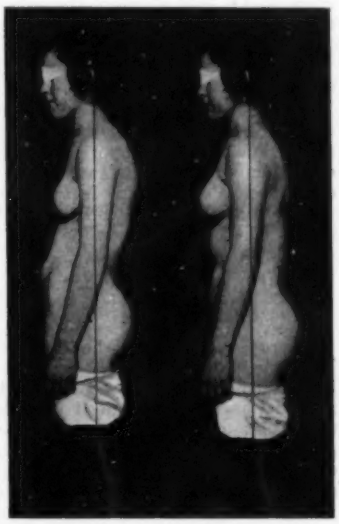

FIG. 12.—Left: round back, Type 2. Right: increasing the pelvic inclination improves the posture but cannot remove the dorsolumbar kyphosis.

The treatment of this group presents just the same problems as sway back—the difficulty of restoring the upper part of the lumbar concavity.

DORSAL KYPHOSIS

There is a group of cases of kyphosis affecting principally the dorsal spine that was at one time regarded as being postural in origin. Recently, however, such cases have been shown to be associated almost invariably with disease of the intervertebral disks and the epiphyses of the bodies of the vertebræ. These cases, therefore, do not fall under the heading of postural deformities.

Treatment

Before embarking on the treatment of postural deformity, inquiry should always be made into its cause. In cases in which there is no mechanical cause, the factors discussed under ætiology have to be considered. Especially is the question of undernutrition worth attention; to give remedial exercises to an undernourished patient is only adding to his troubles. When no other cause is forthcoming, investigation should be made into possible psychological factors. This involves inquiry into the psychological make-up of the patient and his home conditions. In any case of doubt, or when the problem of emotional readjustment is beyond easy solution, it is advisable to obtain the assistance of a medical psychologist. It is of little use to expect a patient to coöperate in remedial work when he is

trying to grapple with an emotional problem which is, to him, of much greater importance.

The treatment of postural deformities falls into three stages. Firstly, restoring sufficient mobility to enable correction to be made; secondly, acquiring voluntary control over the movements that produce correction; and thirdly, the establishment of new reflexes that will maintain permanently the correct posture. Any good system of remedial work deals with all three stages simultaneously; they are only separated here for discussion.

Mobility is limited to an extent sufficient to prevent correction of the deformity in only a proportion of cases. This is of importance particularly in the dorsolumbar kyphosis of sway back, and the limitation of extension of the hips in some cases in which the pelvic inclination is increased. There are three causes of the loss of mobility, one or more of which may be present in any case.

(1) Structural changes in the shape of the bone;
(2) Contracted ligaments; and
(3) Shortened muscles.

A *structural change* in the shape of the bones occurs in some cases of dorsolumbar kyphosis. It is impossible to restore the shape of the bones by any remedial measures. Indeed it is doubtful if any of the most drastic corrective machinery used by orthopædic surgeons has any effect on it. The object of remedial work in structural cases is to develop such compensatory curves as will give the greatest mechanical and æsthetic advantage.

Contracted ligaments and joint capsules may be found preventing correction of dorsolumbar kyphosis or limiting extension of the hips in cases with increased pelvic inclination. The stretching of contracted ligaments, as of any other fibrous tissue, is a matter of difficulty. Forced passive movements, either with or without an anæsthetic, result in tearing the ligaments and do more harm than good. The most effective method of stretching them at all rapidly is prolonged traction. Head suspension is therefore very valuable when dealing with contractions affecting the spine and, if carefully supervised, is well tolerated by patients. Active movements carried to their extreme range and repeated frequently may be of some assistance in stretching ligaments, but care must be taken to see that the movements are not too violent and to ensure that they are localised to the affected region.

"*Shortened muscles*" probably play a part in hindering correction of most deformities that are at all severe. The process of increasing the length of muscles is often referred to as muscle-stretching. This is hardly the right word to use because, so far as is known, muscle-fibres cannot be stretched—they have to be made to relax more fully. This is not merely an academic point, but a practical one which directly affects treatment. The normal physiological response of a muscle to stretching is contraction, and the harder it is stretched the more strongly it contracts. Therefore, passively stretching a muscle calls into action this "stretch reflex" and makes the muscle contract more. The passive stretching of muscles with the idea of lengthening them is a procedure that should be abandoned; it can do no good, and, if carried to an extreme, it will do harm.

The lengthening of a muscle can be achieved by getting it to relax more fully. A muscle relaxes reflexly when its antagonist contracts, but, when a "free" movement is made—that is, one without any resistance to it—the muscle does not relax completely; it maintains enough tone throughout the movement in order to keep the joint under control, and it will go on contracting even when the extreme of movement is reached. However, when a movement is made against resistance, the muscle is enabled to relax more fully because control of the joint is obtained by means of the pressure between the resistance and the contracting muscle. Hence, to stretch a muscle, its antagonist must be made to contract against resistance and continue to work against the resistance when the extreme of movement has been reached. Thus, if the flexors of the hip are contracted, the appropriate exercise is to extend one leg backwards against gravity whilst keeping the trunk vertical, in the manner of the "battement derrière" of the Classical Ballet (Fig. 13). Backward bending from the hips is useless because the movement is made by gravity with the flexors contracting strongly to control it.

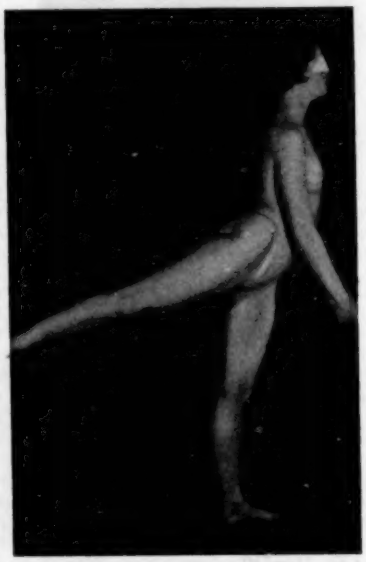

FIG. 13.—The correct movement to encourage extension of the hip and spine.

Voluntary control over the movements that correct a postural deformity is easily taught when adequate mobility is present. In those cases in which mobility is limited at the commencement of treatment, control is learnt automatically whilst mobility is acquired.

In cases where the pelvic inclination is increased, the glutei are the correct muscles to restore it to normal. The glutei are the principal extensors of the hips and tilting backwards the pelvis is exactly the same movement as extending the hips. Patients should not be told to "draw the stomach in" or they will use the abdominals. They should be given some such order as to "tuck their tails under them," and then be watched to see that they really are using the glutei. Some patients tend to use the hamstrings for tilting the pelvis; this can be prevented by making the movement in the kneeling position so as to reduce the power of the hamstrings.

The establishment of *new postural reflexes* is the final aim of all remedial treatment. It is just here that so many systems, including that officially recognised in this country, show their greatest weakness. They are mainly concerned with strengthening muscles and increasing mobility, and make but little effort to teach the patient how to hold the new posture. Remedial work requires "postural fixation" not "postural change," so, when it is possible to make a voluntary correction, exercises that move the parts of the body principally concerned can do no good. Exercises must be directed towards keeping those

parts as still as possible whilst the rest of the body is moved. Thus the patient is taught to keep a good posture during every variety of movement.

It would be out of place to attempt to describe here any particular remedial system that will fill the criteria set out. It requires but little ingenuity to invent one once the principles are understood. I am concerned mainly to emphasise that it is not movement, but absence of movement, of any given part that is essential for the establishment of a postural reflex. Success or failure of treatment depends on the extent to which the coöperation of the patient is obtained. During the remedial class it is only possible to teach the patient how to get into the new posture and how to hold it under a variety of conditions. The establishment of an unconscious reflex that will hold the new posture permanently is only possible if the patient continues to try after the class is over, and it can never be done if, as soon as he is out of the room, he just drops back into the old posture. For treatment to be successful the patient really must want to be cured and make up his mind to succeed. The personality of the teacher, and his ability to win the patient's confidence and keep his interest, is of just as great importance as a knowledge of remedial technique.

Summary

1. The regulation of posture is a function of the central nervous system which determines the *length* at which the muscles are habitually held; the *strength* of the muscles is of less importance.

2. The importance of rapid growth, undernutrition, and psychological factors in the ætiology of postural deformities is emphasised.

3. A new instrument is described for measuring the pelvic inclination. This angle in "normal" adult males averages 31°, and in females 28°. In children it is somewhat less, but it increases up to 11 years of age when the adult level is reached.

4. The pelvic inclination is regulated by the muscles surrounding the hip-joint, and not by the trunk muscles.

5. Deformities are classified on the basis of their two principal components—variation in pelvic inclination and the presence or absence of a dorsolumbar kyphosis—into four types: (1) lumbar lordosis; (2) sway back; (3) flat back; (4) round back.

6. Final correction of a deformity can only be made by establishing new postural reflexes. This can never be done by movement, but only by absence of movement, therefore exercises must be designed to keep still the parts of the body concerned.

It is a pleasure to thank Prof. Samson Wright for permission to work in the department of physiology at the Middlesex Hospital medical school, and also the honorary staff of the Royal National Orthopædic Hospital for allowing me to examine a number of their patients. I also wish to express my indebtedness to Sir Frederick Menzies and the London County Council for permission to attend the medical examinations of elementary school-children, and to Mr. Paul S. Newby, director of physical training at the Central Y.M.C.A., and Miss E. M. Prosser, sister-in-charge of the massage department of the Middlesex Hospital, for their kindness in procuring me normal subjects for measurements of pelvic inclination, and to the many subjects themselves, whose great patience has made this work possible.

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PRURITUS ANI*

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The sensation of itching, like pain, is a protective function of the body. Pain causes various reflex acts while itching leads to scratching or rubbing to remove such things as insects which have a harmful effect on the organism. Pain is transmitted by the autonomic as well as the cerebro-spinal nervous system, but itching is carried by the somatic nerves alone as only these supply the parts where itching is biologically useful. If, however, scratching is unlikely to do good, itching must be regarded as pathological and worthy of the name pruritus. It is apt to occur more frequently about the various body orifices than elsewhere, no doubt to get rid of excess discharge, and at two of these, the anus and the vulva, it not infrequently becomes pathological and so severe as to acquire the status of a syndrome or even an actual disease.

Anal irritation of minor degree occurs in a considerable proportion of cases of internal hæmorrhoids and other local abnormalities, but the term pruritus ani denotes a condition where irritation is relatively severe. In it the symptoms are often worse at night soon after retirement to bed, and they may seriously interfere with sleep. Sometimes there are intermissions when the irritation is in comparative abeyance and the patient may think he has got over the worst of his trouble only to be sadly disillusioned by the next attack. Carlyle could not have known of this disease when he said that the greatest pleasure in life is to scratch the part that itches, for the patient gets little relief from his efforts. The sensation is described in such terms as smarting, tickling, burning, pricking, and it is situated in the lower end of the anal canal, the anal verge, and a variable extent of the peri-anal region. The affected skin may be surprisingly normal in appearance, but it is usually thickened and somewhat sodden—a change described as lichenification—and often shows superficial cracks radiating from the anus. Superimposed on this, scratching and formidable remedies may have grafted a traumatic dermatitis, and though septic infection is thus introduced it is curious to note that inguinal adenitis rarely if ever occurs (O'Donovan 1936).

Ætiology

There must be few diseases that have been ascribed to so many causes as pruritus ani. Lord Horder (1935) has said "it is the merest tyro who supposes that . . . local pruritus (is due) to local causes. I am quite sure that pruritus ani . . . may be of entirely general origin." On the other hand, Lockhart-Mummery (1915, 1934) has long believed that a local cause is present in all cases, but that in some our knowledge is insufficient to recognise it. It is agreed that anal pruritus may be caused by local

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(*Continued from previous column*)

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conditions that give rise to a discharge, such as fissure, fistula and infected anal crypts, and proctitis, colitis, and ulcerative diseases of the bowel. It is likely that threadworms produce itching in this way. Internal hæmorrhoids and polypi may induce a seepage of mucus by excess of secretion or by allowing it to escape by prolapsing into the sphincters and preventing their closure. Scarborough (1933) believes that all cases arise in such a manner and can be cured by removal of the cause but his claim is unique.

There is no doubt in the minds of a colleague and myself that mucus can cause anal irritation as we have produced it on ourselves by its application, but it is probable that some sensitivity must be present as well, for it is not uncommon in some rectal conditions to see the peri-anal skin moist with mucus or other discharge without causing symptoms. Dirt, excessive local sweating, and pediculi may cause irritation but can easily be recognised. Bacterial and fungus infections have been put forward as causes but have not found acceptance. Where a careful search has failed to reveal any local abnormality distant lesions have been blamed, especially gynæcological abnormalities; conditions of urinary obstruction such as stricture, prostatism, and stone in the bladder; and cholecystitis and diseases of the liver. In the absence of these, focal sepsis, gout, rheumatism, and diabetes are commonly mentioned, though with what justification I am unable to say. The fact that attacks may be brought on by tea, coffee, and alcohol, and in some people by cheese, fish, strawberries, &c., has added allergy to the list of causes, and lastly, and perhaps inevitably, the disease is often regarded as a neurosis.

In order to escape from this diagnostic maze some classification is necessary and I propose to distinguish between those cases due to a discharge and those which are not. I regard cases associated with a discharge, and cured by its removal, as cases of exogenic dermatitis. In them the rash and irritation tend to pass backward in the natal cleft and forward on to the scrotum owing to the spread of the offending secretion in the directions of least resistance, and though in some of these cases the irritation may be severe, in the majority it is comparatively mild. True or idiopathic pruritus ani is however a separate disease; it may occur in a severe form with little, if any, alteration in the naked-eye appearance of the skin; when it is coincident with an exogenic dermatitis it persists after the latter has been cured; it has a pathology of its own which is not, as is commonly supposed, the result of scratching; it may have superimposed on it a traumatic dermatitis due to scratching or irritant applications, but when this has cleared up after suitable treatment the pruritus remains; and it occurs in the complete absence of abnormalities in the anorectal region as judged by recognised standards and also in the absence of any general disturbance of health.

The sensation of irritation arises in the epidermis for, as pointed out by O'Donovan (1936), irritation ceases if ulceration occurs. It is due to minor but more or less rapid changes in tension (Bunch 1912), such as are caused by the burrowing of the *Icarus scabiei* or when tight garments are suddenly discarded. It is a feature of whealing and Sir Thomas Lewis (1927) mentioned itching when a wheal was caused by freezing the skin and no irritant was introduced from outside. It occurs in many skin diseases and in these œdema of the epidermis is commonly found, and it is reasonable to assume that where the circulatory balance is upset, as it is in œdema, abnormal variations in tension are apt to occur and irritation is likely to arise.

In this paper I hope to show that idiopathic pruritus ani is caused by œdema of the peri-anal skin following on stasis in the external hæmorrhoidal veins; in other words, it is due to external piles.

Histology

As regards the microscopic appearances of pruritus ani Crawford (Haskell and Smith 1936) regarded them as essentially those of a low-grade inflammatory process with proliferative changes. He found much thickening of the epidermis, dilatation of the superficial blood-vessels and lymphatics, extensive infiltration of white cells, usually small lymphocytes, and fibrosis in the deeper layers of the cutis with œdema superficially. Montgomery (Rankin, Bargen, and Buie 1932), reporting on 5 cases, gave similar findings but believed that the changes resembled those of neurodermatitis and urticaria rather than inflammation. Further, it is important to note that in comparing cases of normal naked-eye appearance with those where frank change was present he found the microscopic appearances differed in degree only and not in kind.

With the help of Dr. Whitelaw and Dr. Felix Smith I have examined sections from 6 cases; 5 of these presented various degrees of lichenification, but one showed no such alteration. In all there were changes similar to those described by Crawford and Montgomery. The epidermis was thickened, in some parts to twice its normal depth, and showed various degrees of acanthosis. Œdema was evidenced by swelling of the prickle cells and poor staining of their nuclei, and by the fact that the intercellular channels were more evident than in normal skin. Some thickening of the horny layer was usually present and in one case this was very marked. In the cutis there was dilatation of the blood-vessels, especially the veins, and obvious œdema shown by separation of the connective tissue fibres and poor nuclear affinity for stain. The lymphatic vessels were also dilated. There was usually some lymphocytic infiltration of the papillæ and the subpapillary layer, most marked round the vessels, but this feature was very variable, being absent in some parts of the sections (see Figure). An occasional eosinophil was seen in one section only.

It might be said that the lymphocytic infiltration suggests the presence of an irritant factor, but it is not a very pronounced feature except in one case and is hardly noticeable in some areas of the sections. Also in three normal specimens of peri-anal skin examined a certain number of lymphocytes were seen. Their presence in any number is not a characteristic of the disease and the essential change is one of œdema. Such œdema, as elsewhere in the body, can be produced by local venous stasis. It is, I think, reasonable to assume that in the earliest stage of the pathological change pruritus has not manifested itself, but the threshold to irritation is lowered; the skin is in a prepruritic state.

Effect of Venous Stasis

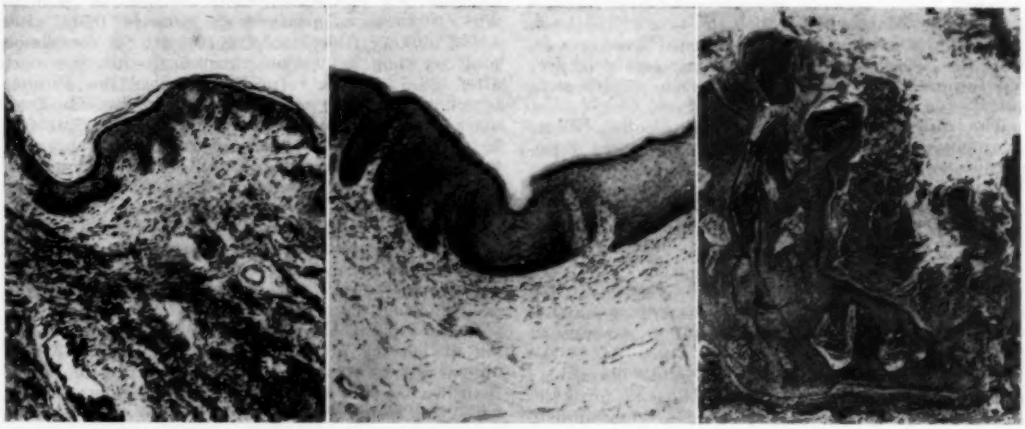
Let us now see how the theory of venous stasis agrees with the clinical manifestations and the therapeutics of the disease. A dramatic feature in the symptomatology is the fact that a patient who is free of symptoms during the day may be attacked by intolerable itching soon after getting into bed. He gets up and applies his favourite powder or ointment and relief sooner or later follows.

He goes to bed again and again the itching starts. He may find that the only way he can obtain sleep is to spend the rest of the night in a chair. The usual explanation that all itching is worse at night because one is warmer in bed and the mind is not occupied is hardly adequate. In the erect position the pressure of the valveless portal system is conveyed to the anal veins and when the patient lies down this pressure ceases and there is a sudden drop in tension in the peri-anal veins which is transmitted to the skin of the area. This would account for the great exacerbation that occurs at night, and the same train of events is seen in varicose eczema of the legs.

Neurosis is merely of interest because the neurotic complains more bitterly of his symptoms than the normal person, and if he has no disease to show to the uninitiated the poor fellow gets little sympathy.

Clinical Findings

The skin in the lower end of the anal canal and its vicinity is normally very thin and thrown into folds only a millimetre or two in width. In cases of pruritus ani the folds are much wider and the skin is felt to be thicker than normal when picked up between the finger and thumb owing to œdema even when no other change is present. When an



A B C

A. Normal peri-anal skin: note density of staining. (× 80.)
B. Pruritus ani: showing pallor of dermis and epidermis due to œdema. (× 80.)
C. Severe pruritus ani. The papillæ are flattened out and there is a polypoidal formation with great increase in thickness of the keratin layer and epidermis. (× 20.)

As regards the part played by gynæcological conditions inflammatory affections will cause general congestion of the pelvis, and pelvic tumours may interfere with the venous return in both the superior hæmorrhoidal and internal iliac veins and so cause anal congestion and stasis. A similar result will be brought about by the increased intra-abdominal tension involved in the straining of urinary obstruction, and affections of the liver by congestion or by mechanical means will react unfavourably on all the radicles of the portal system including the anal veins.

The effect of certain foods in sensitised individuals is explained by the fact that the ingestion of any substance that acts on the skin vessels will lead to changes of tension in that structure, and though these changes may not be sufficient to cause any sensation in normal areas they may produce itching in a prepruritic zone such as has been adumbrated. Allergy is thus accounted for. Slight rises in temperature produced by focal sepsis would act in a similar manner and the effect of alcohol is also explained in this way. The conception of a prepruritic state also helps us with regard to the action of tea and coffee in starting attacks as caffeine facilitates the reception of sensory impulses (Cushny 1924).

I will not attempt to explain the supposed importance of gout, rheumatism, and diabetes; as previously stated they are often mentioned, but their relationship to pruritus ani is open to doubt and Lockhart-Mummery (1915) has said he has never seen a bad case due to diabetes.

anoscope is inserted and slowly withdrawn past the mucocutaneous junction the skin below this line forms large bulges through which the bluish colour of the enlarged underlying veins is often apparent.

Treatment

Turning now to the effects of treatment, Morley (1916) noted that pruritus ani sometimes cleared up after the injection treatment of quite small and symptomless internal piles. I have confirmed this on many occasions and would go further and say that benefit may be obtained by similar injections in the complete absence of any sign of internal hæmorrhoids. This treatment acts by destroying the veins of the internal hæmorrhoidal plexus and relieving back pressure on the external hæmorrhoidal veins. It is not surprising, however, that the results of such treatment vary as the anastomosis between the two plexuses is not constant and the external plexus has connexions with the systemic veins.

Most operations are based on that of Sir Charles Ball (1905) which was devised to cut all the sensory nerves to the affected part. An essential part of the procedure is to undermine the skin of the anal canal to above the mucocutaneous line. Lockhart-Mummery (1934) speaks well of this operation and states that though sensation returns in 4–6 weeks the pruritus is cured in most cases. It is stated that the skin operated on must be rendered completely anæsthetic. In six recent cases I have made a curved incision on each side of the anus and undercut the skin of the anal canal to just above the mucocutaneous line,

taking special care to destroy the veins; extensive undermining was avoided as far as possible and sensation was not completely lost. In five cases the pruritus disappeared and the skin became normal in appearance in a short time. In one case the pruritus reappeared after only 14 days, but it yielded to subcutaneous sclerosing injections and I regard this failure as due to faulty technique. From these results it would appear that complete section of the nerves is not necessary for cure, as far as one can judge at this stage, and here I would point out that it is impossible to carry out Ball's operation without destroying many if not all of the underlying veins.

Sir Frederick Wallis (1911) believed pruritus ani was due to some lesion at the mucocutaneous junction and he excised this along with the skin of the lower part of the anal canal. He claimed good results from this operation but again it is impossible to carry out the procedure without excising the neighbouring veins.

The subcutaneous injection of alcohol, dilute hydrochloric acid, and other substances was introduced as a substitute for operation to destroy nerves but the beneficial effects claimed can be explained in a similar manner. Solutions of anæsthetics in oil will stop the itching temporarily and allow a scratch dermatitis to subside, but they also will tend to strangle the veins by causing fibrosis.

As far as external applications are concerned they may be very important in the treatment of patients who have become sensitised to some superadded infective skin condition, and in these cases the coöperation of a skin specialist is often necessary; but in the treatment of the true idiopathic form the value of such remedies is belied by the very numbers that have been recommended. Radioactive mud, colon lavage, vaccines, ionisation, artificial and natural sunlight, &c., may, I think, be placed in the same category and their lack of value in treatment is easily understood in the light of the theory presented.

The claims put forward on behalf of Röntgen rays are usually moderate, but they appear to have some curative value and the explanation of this may be a destructive effect on the blood-vessels.

Conclusion

In conclusion, I believe that the severest form of pruritus ani and the occasional itching found in association with internal piles are merely different degrees of the same condition and that the underlying cause is œdema of the skin due to venous stasis. If I have not convinced you I can at least say that I have found this view to be a useful working hypothesis.

I wish to express my indebtedness to Dr. W. Whitelaw for his interest in the pathological side of the work and for preparing the photomicrographs.

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COMPARATIVE STUDY OF TUBERCULIN REACTIONS AND RADIOLOGICAL FINDINGS

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THERE is still no agreement as to where we are to fix the limit dividing positive from negative tuberculin reactions and as to which technique should be used, in particular whether Pirquet or Mantoux. During recent years in Norway we have regarded the Pirquet reaction, by the scarification method, as positive when induration measures 2 mm. or more after 48–72 hours; the Mantoux reaction is considered positive when induration measures 10 mm. or more after 48–72 hours. In France also the Pirquet technique is employed as a rule. In Sweden, Denmark, and England, on the whole, the Mantoux test is preferred and most workers fix the limit between positive and negative reactions lower than we do. Thus D'Arcy Hart fixes the minimum for a positive Mantoux reaction, after 48–72 hours, at "an area of erythema or erythematous infiltration" whose greatest diameter is 5 mm.; he uses up to 10 mg., and on occasion 100 mg., of tuberculin. Arborelius considers a second Mantoux test with 1 mg. tuberculin as positive when there appears after 48 hours a definitely palpable induration and an area of erythema measuring at least 5 mm. by 5 mm. Thus both these observers fix the minimum for positive reaction lower than we do and think our method too insensitive, with the result that we obtain too few positive reactions among healthy subjects—viz., approximately 50 per cent. at twenty years of age, while Arborelius obtains 85 per cent. and D'Arcy Hart, from twenty-one years of age, 95 per cent.

Now it is generally agreed that on the whole we can distinguish between pronounced tuberculin-positive individuals and completely tuberculin-negative individuals, which corresponds to infected and uninfected individuals. But the dividing line between these two groups is difficult to determine, for two reasons: on the one hand there are the false reactions which are due to non-specific substances in the tuberculin, especially when more than 1 mg. of tuberculin is injected; on the other hand, the reaction may fail because of insufficient dose, faulty technique, or for other reasons. I have disregarded in the following the anergy which is seen, for example, in certain diseases and among the aged, for it has no interest in connexion with this material which consist of young healthy subjects.

In order to fix the limit between positive and negative reactions all observers argue from certain characters of the definite positive and definite negative reactions—viz., the size of the reaction, its mode of development in the course of the first few days, and the result of repeated tests with the same or increasing doses. But in this way evidence is sought in that which is to be proved; this is the case, for example, if we regard the Mantoux test as the reliable one and compare the various Pirquet responses with that of the Mantoux test. This mode of reasoning involves a logical *circulus vitiosus* in which that which is to be proved is used as argument in the chain of reasoning: both argument and conclusion are links in the same chain, the tuberculin reaction itself.

In order to break this vicious circle it is therefore necessary to control the tuberculin reactions by facts obtained from an independent source of evidence.

I may first reiterate the fact that with our Pirquet technique we always find a higher tuberculous morbidity among the Pirquet-negative than among the Pirquet-positive when both groups are exposed to infection. This corresponds to the known experimental finding that an initial infection with tubercle bacilli in animals has a more serious outcome than a later "superinfection" with small doses of tubercle bacilli. With our Pirquet technique, therefore, we distinguish on the whole two different immunobiological groups, but this control is not sufficient to draw any exact line between infected and uninfected.

THE INQUIRY

In an attempt to determine with more certainty this limit between positive and negative, I have compared the tuberculin reactions with the simultaneously obtained radiological findings in 1697 students. The great majority of the material is derived from the university tuberculosis clinic at Oslo, where the radiological diagnosis is made by the radiological department of the State Hospital; all the students are radiographed. The tuberculin tests have been carried out and interpreted by various doctors from my department at Ullevaal Hospital, but the same procedure is always followed. All those examined were healthy, without previous history of tuberculous disease and not vaccinated with B C G.

851 STUDENTS REGARDED AS TUBERCULIN-NEGATIVE

—	Totals.	Pleural changes.	Lung shadows.	Calcification in lung or hilus.
		%	%	%
Pirquet, 0 mm. / Mantoux, 0 mm.	585	4·3	1·2	0·7
Doubtful Pirquet or Mantoux	139	4·3	0	0
Two Pirquet tests, 0 mm.	65	3·1	0	0
Single Pirquet test, 0–1 mm.	62	6·5	1·6	3·2
*1st: Pirquet neg. / 2nd reac.: Mantoux 1–9 mm.	63	4·8	0	0

846 STUDENTS REGARDED AS TUBERCULIN-POSITIVE

1st: Pirquet, 0 mm. / 2nd reac.: Mantoux ≥ 10 mm. (or Pirquet positive)	81	6·2	2·5	0
Pirquet, 2 mm.	40	0	0	0
,, 3 mm.	61	3·3	3·3	13·1
,, 4 mm.	98	6·1	4·1	12·2
,, 5 mm. or more	566	4·2	6·9	16·2
*1st: Pirquet neg. / 2nd reac.: Mantoux 10–40 mm.	89	3·4	1·2	1·2

reac. = reaction.

We see from the accompanying Table that the 851 students whom we have regarded as tuberculin-negative fall into four groups.

(1) First tuberculin test by Pirquet method and second test by Mantoux method give no measurable induration after 48 hours.

(2) Doubtful reactions: first test (Pirquet) may be doubtful or feeble positive, 1–2 mm. induration; later Mantoux test negative or the later Mantoux test may give 1–9 mm. induration (in some cases 10 mm. or more, but a further reaction is then negative).

(3) Two successive Pirquet reactions negative.

(4) A single Pirquet test with 0–1 mm. induration as result.

In 846 students whom we have regarded as tuberculin-positive there is, first, a group in whom the first test (Pirquet) is negative, the second test (Mantoux or, in a few cases, Pirquet) is positive. In the remaining groups only a single Pirquet test has been made and the reactions have been 2, 3, 4, 5 mm. or more (induration). In some cases giving a Pirquet of 2 mm. a Mantoux test has been carried out.

In the two groups, tuberculin-negative and tuberculin-positive, I have also indicated by asterisks the results of a second test (Mantoux), the induration measuring 1–9 mm. in the negative group, 10–40 mm. in the positive group. Among these last, 89 in number, 62 gave induration measuring only 10–20 mm. The Mantoux tests are always carried out with tuberculin dilutions supplied in sealed ampoules (1/10 c.cm. = 1 mg.); these are opened after the lapse of some days or weeks, on occasion some months. A freshly prepared dilution of tuberculin gives as a rule a slightly more powerful reaction, but, according to comparative tests we have recently made, the difference is not great.

I have now grouped these tuberculin-positive and tuberculin-negative individuals according to the radiological findings. Three groups have been considered.

(1) Changes in the pleura, usually diaphragmatic adhesions, sometimes thickening over the apex, but without changes in lung or hilus.

(2) Shadows in the lung fields, in some cases with changes in the pleura, but without calcification.

(3) Deposits of calcium in lung tissue or glands, in these there may be in addition pleural and lung shadows.

These radiological changes are distributed in the following way among those we have regarded as tuberculin-negative and tuberculin-positive respectively:—

The purely *pleural changes* appear with approximately equal frequency among tuberculin-negatives and positives, 0–6·5 per cent. The purely pleural changes are therefore clearly not of tuberculous ætiology but must be due to non-specific affections such as, for example, bronchopneumonia. The distribution of pleural changes which are combined with lung or hilus changes is not revealed in the Table.

The pure *lung shadows* without calcification, presumably corresponding to a deposition of fibrous tissue, are distinctly more frequent among the positive (0–6·9 per cent.) than among the negative (0–1·6 per cent.); they may obviously be due to non-specific lung infiltrations but are more frequently a sign of a healed tuberculous process.

Calcified foci occur, though rarely, among the definite tuberculin-negative (0·7 per cent.), which is not surprising; there are other causes of calcification besides tuberculous—e.g., calcified lung emboli, intra-alveolar ossification; in pneumonia also there may occur necrosis of lung tissue, leading to abscess formation, and presumably also in glands; and where there is necrosis the conditions necessary for calcification are always present. In the group who received only a single Pirquet test, with negative result, there appear also two cases showing calcification; but here the numbers are so small that we must not lay much stress upon the percentage—3·2. We do not know either what result would have been obtained by a repeated Pirquet test on these subjects.

In the group which we have regarded as tuberculin-positive we find calcified foci with much greater frequency, but only when the Pirquet test has given an induration measuring 3 mm. or more. The frequency of calcified foci in these groups varies from 12·2 to 16·2 per cent. These figures represent only a fraction of the calcified foci actually present; thus Frimann-Dahl and Waaler, by radiography of 200 excised lungs from autopsy material extending

over all ages, found calcification shadows in 71 per cent. Even though the frequency of calcified foci in our material is thus much less, we nevertheless find calcified foci in the positive groups approximately twenty times as frequently as among the purest negative group. This frequent calcification is therefore obviously an index of tuberculous infection, and this infection is revealed by a Pirquet reaction of 3 mm. or more.

On the other hand, we have no calcification shadows in two of the groups of our material which we have regarded as tuberculin-positive—namely, (1) those in whom the first Pirquet reaction is negative while the second test, Mantoux or Pirquet, is positive, and (2) those in whom the first Pirquet test gives a reaction measuring 2 mm. This finding strongly indicates that at any rate the great majority of these feeble tuberculin reactions do not correspond to tuberculous infection.

If we consider in particular those cases (indicated by asterisks in the Table) where the second test—a Mantoux test—has given a more or less pronounced reaction after a negative response to the first Pirquet test, we find only a single case with calcification. According to this it appears doubtful whether the Mantoux test performed after a negative or doubtful Pirquet test has any significance or is at all necessary. We must, however, qualify this conclusion in two ways. Firstly, a second tuberculin test can probably reveal a tuberculous infection if the reaction be sufficiently powerful, even though the first test was negative. In most of our cases the second reaction was of moderate extent, and we can therefore neither confirm nor deny the possibility of a "sensitisation" effect, but must regard it as possible. Secondly, we do not regard our figures as of universal application; it would seem that other Norwegian observers have found calcification in association with doubtful or negative tuberculin reactions more frequently than we have, and we are unable to decide whether this divergence is due to any difference in interpretation of tuberculin reactions or radiological appearances. Our radiological control applies therefore chiefly to the tuberculin technique we have employed among healthy subjects at about 20 years of age.

A clinical case, recently observed, appears to support our view.

A nursing probationer, on enrolment at Ullevaal Hospital, gave on two successive occasions (each with two scarifications) a completely negative response to the Pirquet test (Sept. 5th–7th and 7th–9th, 1936). A third tuberculin test by the Mantoux method, with 1 mg. tuberculin (Sept. 9th–11th) gave a reaction with 12 mm. erythema and 10 mm. induration. She began work in the tuberculosis wards on Dec. 22nd, 1936. On Jan. 26th, 1937, she developed erythema nodosum and a Pirquet test on Feb. 25th now gave a vesicular reaction with 25 mm. erythema and 10 mm. induration. A radiogram taken on Feb. 26th showed a small isolated opacity in the left infraclavicular region and the blood sedimentation rate on Feb. 28th was 44 mm. in 1 hour. There can be little doubt that this patient's Mantoux reaction, showing 10 mm. induration, was non-specific, and that the erythema nodosum was evidence of a primary infection.

CONCLUSION

When by any method of investigation we wish to draw a line between two biological groups or conditions, such dividing line is always more or less arbitrary; in reality there will be some overlapping of the two groups in the region of the dividing line. We should therefore rather reckon with a dividing zone than a dividing line, but in practice it may be necessary to draw a sharp line, and, in our material, this line should therefore lie between 2 and 3 mm. induration after the first Pirquet test; a repeated tuberculin test does not as a rule appear to reveal any additional infected individuals unless it gives a very powerful reaction. All this applies to human infection, which is, practically speaking, the only type existing in Norway.

It therefore appears that in our Norwegian student material, so far from obtaining too few positive reactors as our critics assert, we have included too many.

INHIBITION OF THE GONADOTROPIC ACTIVITY OF THE HUMAN PITUITARY BY ANTISERUM

BY I. W. ROWLANDS, Ph.D.

AND

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(From the National Institute for Medical Research, London, N.W.3)

THE prolonged injection of thyrotropic or gonadotropic extracts of ox anterior pituitary tissue into laboratory animals leads to their becoming gradually insensitive to the stimulating action of the extracts and may even cause a condition of hypopituitarism such as is found after hypophysectomy (Collip 1934). This result was originally ascribed to exhaustion of the responding gland, but in 1934 Anderson and Collip showed that the blood-serum of an animal chronically treated with thyrotropic extract would protect a second animal from the effect of the extract. The same thing was afterwards shown for gonadotropic extracts. These remarkable observations, subsequently confirmed by other workers, have opened up wide fields of research.

The mechanism of the production of the antithyrotropic and antigonadotropic substances is not understood. It may be said definitely that their site of origin is not the responding gland, since Oudet (1937) has recently shown that antithyrotropic activity can be evoked in the thyroidectomised rabbit. Probably no endocrine organ is involved. A recent attempt (Sulman 1937) to associate the phenomenon with Abderhalden's "protective ferment" does not appear promising. The most probable explanation is that the active substance or grouping is linked with a protein having antigenic properties and that the production of antihormone activity is an immunological reaction. If so, by analogy with thyroglobulin, further work may lead to the separation of the prosthetic group from the protein and to the production of active but non-antigenic preparations. The antibody theory is supported by the fact that the activity of the antisera can be concentrated in the globulin fraction—Thompson (1937a) states that all the activity appears in the pseudoglobulin fraction of the antiserum, but this may vary with the species of the donor. The theory is further supported by Thompson's observation (1937b) that the continued injection of sheep pituitary extract into a sheep does not lead to its serum acquiring the power to neutralise the action of the extract on another animal, by Twombly's failure (1936) to find antihormone activity in the serum of a woman chronically injected with an extract of human urine of pregnancy, and by Katzman, Wade, and Doisy's analogous work on the rat (1937).

These results agree with our own experience, and almost exclude the possibility that "antihormones," of the kind produced experimentally, play any part in the maintenance of the endocrine balance of the normal animal. It is as yet uncertain what degree of zoological relationship, between the species from which the extract is made and the chronically injected animal, is compatible with "antihormone" formation. Apparently, a wide divergence may be required, since ox pituitary extract does not seem to evoke a strong response in a sheep, or pig pituitary extract in a goat.

There are other aspects of the specificity problem, such as species specificity and source specificity, in the effectiveness of antisera. It is known that sera of animals immunised to ox or sheep pituitary extracts will inhibit gonadotropic extracts of the pituitaries of several different species, but the full range of effectiveness has not yet been investigated. Sources of gonadotropic extracts include pituitary, human urine of pregnancy, human placenta, and equine pregnancy serum. It is likely that considerable immunological specificity will be shown between the substances from these different sources. Thus, antiserum to extract of human urine of pregnancy is not effective against ordinary pituitary extracts, while antiserum for ox pituitary is only partially effective against extract of human urine of pregnancy (Rowlands 1937). Antiserum to gonadotropic extract of pregnant mare serum appears to be only partially effective against other types of gonadotropic substance (Thompson and Cushing 1937). One of us (I. W. R.) has examined the interaction of many antisera and gonadotropic extracts and the results will form the subject of a detailed report.

For clinical application it is important to produce antisera capable of neutralising human thyrotropic and gonadotropic substances. Fluhmann (1935) was able to obtain serum from a number of rats immunised to human pituitary, but such a technique would be impracticable on a large scale, and the problem is to find what antisera, capable of being produced in bulk, are effective against the gonadotropic or thyrotropic substances of human pituitary. We have not yet been able to prepare sufficient amounts of human thyrotropic extracts to test antithyrotropic sera, but it is hoped to do so eventually. Human pituitaries, however, prove to have high gonadotropic activity and a comparatively small number have provided adequate material for quantitative experiments.

It has been found that rabbit antisera to ox and horse gonadotropic extracts are at least partially effective against the gonadotropic activity of human pituitaries, but this fact is at present only of academic value, since extracts of ox and horse pituitaries are highly impure, available only in limited amounts, and doubtfully antigenic in animals large enough to provide adequate amounts of serum. Clinical possibilities are, however, suggested by the experiments described below, which show that serum from an animal immunised to gonadotropic extract of human urine of pregnancy will obliterate the gonadotropic effect of human pituitary extract on test animals.

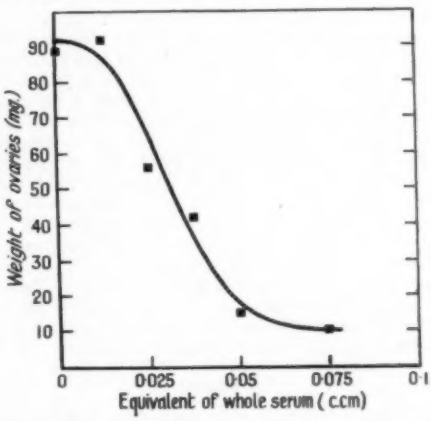
METHODS

Antiserum to gonadotropic extract of human urine of pregnancy was prepared by subcutaneous injection of a 40 kg. goat with 10 mg. rising to 20 mg. (1000–2000 rat units), daily of Pregnyl for five months. The response of the immature rat ovary, as judged by weight, was used to measure the activity of the Pregnyl and the effectiveness of the antiserum. Groups of ten rats (40–50 g.) were given five daily injections, and killed 24 hours after the last one. The antiserum and the Pregnyl, when given simultaneously, were injected on opposite sides of the animal. The ovaries were weighed after fixation in Bouin's fluid. The ovaries weigh 10–12 mg. without treatment; a total of 0·25 mg. of Pregnyl caused increase to about 35 mg., which is slightly less than the maximum average size (40 mg.) obtainable in this period by urine of pregnancy extracts (Deanesly 1935).

When the goat had been injected for three months, 0·0125 c.cm. of the antiserum was capable of inhibiting that amount of urine of pregnancy extract required to give 35 mg. rat ovaries. Assuming the goat to have had 1·5 litres of serum, its total antigonadotropic power equalled 30 g. of Pregnyl—i.e., about 20 times the amount administered over the three months. It has been found (unpublished data) that this antigonadotropic activity can be quantitatively recovered in the globulin fraction of the antiserum.

EXPERIMENTAL RESULTS

The anti-Pregnyl serum known to inhibit gonadotropic material from pregnancy urine was tested against placental gonadotropic extract and found to be effective. The crucial test against human pituitary



Capacity of anti-Pregnyl serum to inhibit the gonadotropic activity of a constant dose of 3 mg. desiccated human anterior pituitary tissue.

gonadotropic extract was then carried out. In a preliminary experiment on œstrous rabbits, a saline extract of 10 mg. of fresh human pituitary caused ovulation in every one of a batch of ten rabbits. The same amount given with 2 c.cm. of the anti-Pregnyl serum failed to cause ovulation in any of ten rabbits of another group. In an experiment on immature rats a saline extract of 25 mg. of human pituitary caused hypertrophy of the ovaries to an average of 70 mg. in a group of ten rats, while one of 20 mg. given with 0·5 c.cm. antiserum failed to alter the average weight, which was normal at 10 mg.

It was decided, therefore, to construct a dose-response curve for the power of the anti-Pregnyl serum to inhibit human pituitary gonadotropic substance. For this purpose a mixed batch of acetone desiccated pituitaries was prepared.[1] A total dose of 3 mg. of this powder suspended in distilled

[1] The pituitaries used were from three accident cases, two males and one female, with ages ranging from 64 to 66 years. Such pituitaries are about three times as potent as those from people under 45.

water, given over five days to a group of ten rats, was found to produce a very strong response (90 mg. ovary weight). The same dose, together with varying amounts of the globulin fraction of the antiserum, was then given to further groups of rats. From the results shown in the accompanying Figure it can be seen that a total dose equivalent to a little over 0·05 c.cm. of the original antiserum inhibited the total activity of the 3 mg. of human pituitary. The weight of the average human anterior pituitary after acetone desiccation is about 50–70 mg. so that 1 c.cm. of the antiserum would inhibit the whole of the gonadotropic activity of one human pituitary.

It is impossible to say what the relation may be between content and output of gonadotropic substance in the human pituitary, but it is known that antiserum may be effective against the secretions of an animal's own pituitary (Parkes and Rowlands 1936, Rowlands 1937), and the above results indicate a strong probability that the gonadotropic activity of the human pituitary in situ might be inhibited by adequate amounts of the anti-Pregnyl serum and that a temporary, differential, serological "hypophysectomy" might be performed.

DISCUSSION

The interest of the above results lies in the possibility of successfully treating hyperpituitarism. The preparation of highly active extracts of ovary, testis, and pituitary may make it possible to deal adequately with conditions resulting from the hypofunction of these glands, but the hope of dealing with hyperfunction by endocrine therapy has seemed less good. Now, however, it seems that excessive secretion of the gonads or pituitary might be treated by passively immunising human subjects against their own pituitary hormones. Such a procedure would have great advantages over surgical interference in that the duration of the effect could be regulated, and the obliteration of pituitary activity would be differential. The serum described above would neutralise only gonadotropic substances, but further research may make available selective antisera for the thyrotropic and possibly other pituitary secretions.

SUMMARY

Prolonged treatment of a goat with urine of pregnancy extract (Pregnyl) resulted in its serum acquiring the power to neutralise, in test rats and rabbits, not only the effect of the original antigenic extract but also the gonadotropic activity of human anterior pituitary.

The activity of the serum was such that 1 c.cm. would inhibit the gonadotropic power of a whole human pituitary.

Our best thanks are due to Dr. P. Hartley who prepared the globulin fraction of the serum; to Major G. W. Dunkin who undertook the immunisation of the goat; and to Dr. Dorothy Russell who kindly obtained the human pituitaries. We are also indebted to Organon Laboratories Ltd. for the generous supply of Pregnyl.

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REGIONAL ILEITIS: CROHN'S DISEASE

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THE reading of an article on Crohn's disease (Hurst 1936) has been illuminating in the reconsideration of a diagnosis made seven years ago.

In 1932 Crohn of New York drew attention to a not uncommon intestinal condition looked upon in the past as a hyperplastic tuberculosis of the lower ileum and cæcum. He described the clinical picture and demonstrated that it was definitely not tuberculous. The morbid anatomy is that of an inflammation of the terminal ileum which may spread to the cæcum; the affected segment becomes thick and œdematous and rigid, and this is followed by fibrosis and progressive diminution in the lumen of the rigid bowel. In the inflammatory phase adhesions and fistulæ may develop, and although microscopically giant cells are found, yet no tubercle bacilli have ever been discovered and animal inoculation is negative. The clinical picture is one of progressive obstruction of the small intestine.

Since then numerous papers have appeared in America on the subject (e.g., Rosenblate, Goldsmith, and Strauss 1936, and Koster, Kasman, and Steinfield 1936) but the condition is only becoming recognised in England. Cases have recently been recorded by Dickson Wright (1935), Edwards (1936), Barbour and Stokes (1936), and Jackman (1934). A good account has been published in Holland by Snapper, Pompen, and Groen (1936), but Crohn's disease is apparently still unrecognised in other parts of the Continent.

Seven years ago a man aged 51 came under my care suffering from intestinal obstruction and at operation the provisional diagnosis of an inoperable carcinoma invading the ileum and proximal cæcum was made. A lateral anastomosis was performed "to tide the patient over." He rapidly improved, put on 2 st. in weight, and did a labourer's work and was lost sight of. Recently he came under my care again, suffering from a perforated duodenal ulcer, from which he is now recovering.

Hurst's paper had just been digested and this recently acquired knowledge, with fresh radiographic evidence, suggests that Crohn's disease was the probable diagnosis. A brief résumé of the case is therefore given in the belief that it may be useful to others who may meet with a similar condition.

CASE-HISTORY

For 18 months the patient, aged 51, had complained of attacks of pain in the lower right segment of the abdomen. These attacks lasted about a week, often passed off for a few weeks. The pains were griping and accompanied by distension—he became "blown out." His bowels alternated between constipation and diarrhœa, but especially the former, and castor oil was the only medicine which would help him. Occasionally he vomited, his appetite was poor, and he had lost weight.

He was admitted to hospital, and the operation notes state: "Partial obstruction due to a bloodless band over the cæcum, and partial volvulus from this. Appendix removed and band cut; nothing else abnormal found." After this operation he had five months' freedom from all symptoms. Unfortunately they returned, and twelve months later he came under my care. The pains had occurred more frequently, especially about one hour after meals, and in the right iliac fossa. His appetite had become poor; he was afraid to eat because of the pains food caused, and he had lost about 2 st. in the last year, and actually 1 st. in the last six weeks. For the

last six months his constipation had wholly disappeared, and he had instead three to four diarrhœic motions per day. He vomited occasionally, he had never been jaundiced, and he had never passed blood.

Examination.—A thin anæmic patient, with abdomen distended in centre and flanks. Umbilicus stretched and bulging; visible peristalsis present of the small intestine type with loud rumblings; some rigidity in right loin; no mass felt; abdomen very resonant; occult blood +. Mild pyrexia present.

Radiography.—"Great dilatation of the small intestine indicating an obstruction of the lower ileum and ileocæcal valve." Unfortunately this plate was destroyed so no comparison is now possible.

Operation.—A large inoperable mass was found invading the terminal ileum and adjacent cæcum and the diagnosis of carcinoma was made. The naked-eye appearance did not suggest tuberculosis. The ileum above this was very greatly distended almost to the diameter of the normal stomach; the mesentery was thickened and the mesenteric glands enlarged. A lateral anastomosis was made between the cæcum and the ileum above the growth. Recovery was uninterrupted.

At the recent operation the cæcal area could not be palpated for adhesions, and his general condition made speed imperative. Further radiography shows "some remaining dilatation of the small intestine: anastomosis satisfactory: filling defects in the terminal ileum and proximal cæcum amounting to the 'string sign'—a thin irregular linear shadow running through the filling defect." This string sign is described as very characteristic of the disease.

DISCUSSION

Crohn's disease seems to be the correct diagnosis in this case. The treatment usually advised in this condition is total excision of the affected segment, since the disease tends to spread if not eradicated, but this case suggests that simple short-circuiting is sufficient in certain cases, and should be seriously considered when the infiltration of the mesentery renders total excision dangerous.

My thanks are due to Dr. E. Scott who did the radiological work in this case.

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MEDICAL SOCIETIES

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

A MEETING of this society was held on April 9th, Mr. N. F. SINCLAIR, the president, being in the chair, when a discussion on

Sudden Death

was opened by Dr. B. T. PARSONS-SMITH. He said that as a general rule the cause of a sudden death could only be a matter for speculation until a post-mortem examination had been made, but that sometimes the patient's previous medical history might afford valuable evidence; circumstantial evidence might be enough to justify a reasonably safe opinion when, for instance, death followed a massive hæmorrhage in a patient known to have been suffering from an aortic aneurysm or if it followed hæmorrhage after operations or obstetrical accidents. Chronic disease did not necessarily explain sudden death; Sir William Osler had said: "It may seem paradoxical but there is a truth in the statement that persons rarely die of the diseases with which they suffer." In cases of sudden death a post-mortem examination should be deemed necessary however convincing the circumstantial evidence. The speaker then discussed those cases in which the death was incidental to natural causes—i.e., when an acute or chronic disease ended fatally in a sudden and unexpected fashion. According to Glaister 1 per cent. of all deaths from natural causes were sudden, and statistical evidence associated most of these with varying types of cardio-vascular disease. The risk of sudden death was great in such conditions as aortic valve disease, specific aortitis, angina pectoris, coronary atheroma, and myocarditis, both acute and chronic; the sudden asystole had been attributed to vagal inhibition, but Lewis doubted whether permanent asystole could be produced in that way. Sudden death was nowadays associated with ventricular fibrillation, which might develop in all types of human heart disease, notably in digitalis toxæmia, now fortunately less common than it once was. Fibrillation was also thought to be the immediate cause of sudden death following straightforward fainting or vasovagal seizure, and was probably the explanation of the fatalities which sometimes followed trivial accidents, sudden shocks, and painful stimuli.

Hæmorrhage, arterial embolism, and thrombosis were foremost among the vascular accidents which might have immediately fatal results. Pulmonary emboli deserved special mention because of their frequency and high fatality-rate; those coming from venous clots probably were more often fatal than not, while the relatively small emboli from intracardiac sources, unless complicated in some other way, were seldom fatal. Emboli of the major circuit, which arose most often from infective endocarditis and failure of the left heart, might lead to sudden death, commonly by entering the cerebral or coronary arteries; fatal results had also been recorded from their entering mesenteric and suprarenal vessels. Thrombosis, apart from embolism, might cause sudden death when it occurred in the heart or brain.

Dr. EDWIN SMITH, coroner for the western district of London, said that coroners often found that post-mortem examinations had been carried out too inadequately to ascertain the cause of death; for instance, sometimes the coronary or cerebellar arteries had not been looked at. Neglect to open the stomach might lead to the concealment of important evidence; for example, in one case recalled by Dr. Smith of sudden death during anæsthesia the anæsthetist had reason to be grateful to the pathologist who found 2 lb. of figs in the stomach. Other examples of inadequate autopsy were: a seamstress while quietly at work had died suddenly; the doctor had reported death as due to a fractured skull and suggested she had hit her head against a wall as she walked to work. On further inquiry the fracture was found to have been made at autopsy and death had been due to a stroke. In another case a small handkerchief, rolled up at the back of the pharynx, had not been found at autopsy and only came to light in the dissecting-room.

Dr. Smith thought a distinction should be made between deaths due to an anæsthetic and those occurring while under an anæsthetic. The legal

compulsion to notify a coroner of a sudden death was on the registrars and there was no law compelling a doctor to report the cases direct to the coroner. In practice, however, the coroner came to expect doctors to report direct to him cases which were bound to come to his notice. The mental state was sometimes very important in determining sudden death, for example in people with hardened arteries who had to make an after-dinner speech. Dr. Smith mentioned that he did not accept acute gastritis as a cause of death without amplification. In his district the registrars were required to report such certificates to him at once in order that the underlying cause of the gastritis should be ascertained. In conclusion he described the case of a man found dead in a cottage which had been struck by lightning; about half an hour before the storm a man, known to have been on bad terms with the dead man, had been seen leaving the cottage. The jury solved a difficult problem by a verdict that the man had died "from a visitation from God under suspicious circumstances."

Dr. T. SKENE KEITH had analysed the last 800 cases of sudden death investigated by him and had found the following percentages from various causes: cardiovascular disease 60; pulmonary disease 6; diseases of the intestine 2·5; diseases of the central nervous system 1·5; renal disease 0·5; special conditions 6; stillborn 0·5; external agencies 21. For statistical purposes sudden death should be defined, and he would define it as a death which so surprised the doctor that he was not prepared to sign a certificate or when a certificate so surprised the registrar that he did not accept it or when death so surprised the patient that a doctor had not been called in. Deaths from surgical operations came under three headings: In the first group the patient had not the strength to stand a necessary operation either because the operation was too severe, for instance an abdomino-perineal excision, or because the patient was already too reduced, as in advanced acute peritonitis. In the second group death was due to surgical misadventure. Those of the third group were due to status lymphaticus, a condition repeatedly declared dead but one which Dr. Keith believed to exist; it was certainly found far more frequently among children dying under an anæsthetic than among those dying from road accidents. Deaths from external injuries included those from birth injuries which were nearly always due to tentorial tears; these seemed to be found as often after natural and easy labours as after difficult and forceps deliveries. Dr. Parsons-Smith had said how much the doctor might miss the aid of autopsy in diagnosis; the pathologist might miss still more the doctor's contribution of the history. The number of cases coming to autopsy in which the doctor was to blame was remarkably small; mistaken diagnosis was not so uncommon. The pathologist was not absolutely infallible; just as it was much harder to diagnose a fault in a car that would not start than in one that was running badly, the pathologist was up against the difficulty of lack of function. He could only say that he had seen similar appearances before and that they were compatible with cessation of life. While a definite opinion could usually be given on coronary occlusion or atheroma, it was much harder to decide whether myocardial degeneration was a cause of death; Dr. Keith was in the habit of looking in the stomach of these cases just to make sure. Ventricular fibrillation was a comfortable explanation as it allowed any heart to die at any time; it only shifted the burden of proof on to someone else. Death in heart cases was apt to be so sudden that at the Heart Hospital it was unusual for the resident medical officer to get to the bed in time.

Dr. G. S. HOVENDEN mentioned four cases of death in the puerperium, two of which he had signed up as due to air embolism and two to pulmonary embolism; he had been unable to decide which was the cause.

Mr. H. L. ATTWATER had been struck by the comparative frequency of sudden deaths during comparatively trivial operations.

Mr. G. B. WOODD WALKER had recently come across a museum specimen of a ruptured aneurysm of the circle of Willis which had occurred in a window-cleaner. The pathologist had established that the rupture had occurred before the man had fallen off his ladder; the specimen had impressed upon him the importance of post-mortem examination especially in these days of compensation.

Mr. J. KEMBLE thought that patients dying on the operating table and those dying of post-operative pulmonary embolism were alike in being of the sub-thyroid type; sudden death of this kind was not so common among patients who had had pre-operative thyroid therapy.

Dr. GERALD SLOT pointed out the difficulty a pathologist had in coming to any conclusion about the state of the lungs after artificial respiration had been carried out for, say, half an hour. He had recently examined the body of a woman, found with a lysol douche beside her, in whom death had occurred without intracervical interference; such deaths were apparently quite common although douching in other circumstances was without risk. Coronary thrombosis, one of the commonest causes of sudden death in adult men, apparently occurred much more often than it used to do. Dr. Slot spoke of the difficulty presented by the increasing number of undetectable poisons and the desirability of having a panel of medico-legal experts to perform autopsies.

Mr. LEVY, speaking as a barrister, complained that doctors would use terms incomprehensible to the magistrate, lawyer, and jury.

Dr. PARSONS-SMITH, in reply, said the apparent increase in coronary thrombosis was due to its better recognition.—Dr. EDWIN SMITH said both the use of and the objection to medical terms were reasonable; he told how at an inquest on a man who had been shot in the sternum, the foreman of the jury had concluded that the man must have been running away.—Dr. SKENE KEITH, in reply to Dr. Hovenden, said that the distinction between air and pulmonary embolism could have been made by autopsy.

ROYAL SOCIETY OF MEDICINE

SECTION OF PSYCHIATRY

AT a meeting of this section held on April 13th, the chair was taken by Dr. T. A. ROSS, the president, and Dr. C. P. SYMONDS read a paper on

Mental Disorder following Head Injury

He confined himself to cases of closed injury—i.e., those without compound fracture—and omitted all focal lesions and traumatic epilepsy. The outstanding feature, he said, was loss of consciousness in some degree; if a man subsequently forgot what he had done he could be assumed to have been unconscious during the period of traumatic amnesia. The picture in concussion was dominated by the physical state of collapse; the mental state was one of profound stupor, from which the patient recovered

in a period of varying length. He might remain for some time in a state of automatism; or this state might come on after an intermediate period of consciousness. Or recovery might take days, weeks, or months, constituting a state which resembled Korsakow's psychosis. It was these cases which afforded opportunity for detailed analysis of the acute traumatic psychosis. The prognosis was always good. A regular sequence of symptoms could be observed. They had been described as: first, the stupor, then deep clouding of consciousness with resistances; clouding of consciousness with bewilderment; and finally Korsakow's condition. All were included in the amnesia and it was better to treat the state as a whole, noting successive stages in which predominated stupor, confusion, and defective memory for recent events with tendency to confabulation. The stupor was accompanied by restless bodily movements and absence of response to stimuli except the deepest alimentary and protective functions. This state rarely lasted more than a few days. The patient then became excited and resistive; he was wet and dirty and had to be fed, and was sometimes delirious. This lasted for days, weeks, even months, with occasional relapse into stupor. When he began to be accessible he showed profound disorientation in space and time, defect of perception, memory, and judgment, perseveration, disturbance of speech function, tendency to interpret events in the light of long past experiences, and very far-reaching retrograde amnesia. There was a tendency to confabulate. The difficulties in perception played a large part in causing confusion, as did also perseveration and the difficulty of distinguishing the figure from the background in the thought process. There was raised threshold and over-reaction as in lesions of the sensory pathway at any level. Performance was unduly influenced by external events. Perseveration in thought, word, and deed was a striking feature. Speech disturbance might be so prominent as to suggest a focal lesion, but was only part of the general mental disorder. After the first return of automatic speech there was often a rush of jargon-talk; then the talk began to have direction, though meaningless. At this stage the attention could be gained for a minute or two, but responses were so little related to the requests as to appear to be at random.

An interesting illustration was afforded by the response of a patient to the written command "Undo the second button of your jacket and do it up again." He had seized the correct button and fiddled with it, but got no further, and then asked "I rather wondered if you meant your second jacket or my second jacket? Was it your bottom you meant or my bottom?" This threw some light on the basic confusion of thought which characterised the state. A month later he had appeared perfectly normal, and he had since returned to work. Response to written commands returned more slowly than to spoken commands because it was more difficult to grasp the written sentence as a whole.

The transition to the Korsakow state was gradual. A tendency to confabulation continued when confusion had gone. It might lead to false accusations in relation to the accident. Gross defect of recent memory might remain the outstanding symptom for a long time. The mood affected the symptoms; elated easy-going people confabulated readily. Sometimes the mood was indifferent; sometimes there was petulant childish depression; but elation was more usual. The end of the Korsakow stage was not clear cut. The patient of ten showed no insight; its return was an important landmark. The longest record was that of a man of 67 who showed confusion and defective memory fourteen months after the accident, but was well a month later. Age was not a bar to good prognosis. The pathological changes must be reversible to the extent of allowing restoration of function. The amnesia remained absolute for the stupor and confusion and patchy for the Korsakow stage.

POST-TRAUMATIC DEMENTIA

In minor injuries the whole sequence was run through in a few minutes, and in minimal injuries some stages were omitted. Some patients showed residual injuries which might be in some degree permanent. There was no relation between the duration of the traumatic amnesia and the severity of this post-traumatic dementia. Possibly it was due to coarse lesions, slow to resolve and to some extent irreparable, while the underlying condition in the traumatic psychosis was a molecular change, easily reversed. The chief symptoms were alterations in mood, judgment, and memory, and scattered amnesia. The mood changes were often exaggerations of pre-existent traits. These symptoms varied with the age and constitution of the patient and with environmental stresses. This was in contrast with the acute condition, which was rather an impersonal affair. Children showed behaviour disorders like those following encephalitis lethargica. Intellectual impairment was commoner in patients over 45. Patients of manic-depressive stock were especially liable to an attack of this disorder after an injury. Under any stress these patients tended to become sleepless, anxious, and irritable. All tended towards recovery, and residual disability was very rare apart from coarse lesions. Dr. Symonds had notes, he said, of only two cases with permanent disability, and both had had a previous head injury, with apparent recovery, before the causative accident. A persistent long retrograde amnesia indicated serious damage.

Injury might precipitate paranoia, schizophrenia, or manic-depressive insanity by exaggerating previous traits and by creating a state of invalidism to which the patient reacted according to his style. There seemed to be a special liability of this kind in manic depressives. Symptoms might appear, during the confusion, of the traumatic psychosis.

Traumatic neurasthenia, as loosely used, covered three groups of patients: those who suffered from psychogenic hysterical or anxiety states; those really suffering from post-traumatic dementia; and those whose constitution was of the depressive or anxious type and in whom the injury released a condition which ran its course, usually towards recovery.

Attempts had been made to explain the pathology in terms of increased intracranial pressure or sub-arachnoid hæmorrhage, but lumbar puncture often revealed a perfectly normal cerebro-spinal fluid. The only conception of pathology left was the old one of direct molecular damage. The late effects could only be properly understood in the light of a full psychiatric study of the patient. It was not only the kind of injury that mattered but also the kind of head.

DISCUSSION

The PRESIDENT described his own experience of slight concussion due to a riding accident. He remembered his arm round the horse's neck, then a dream state of which he had many memories, and finally, he came to in a farmhouse. He remembered a cold, familiar but unplaceable landscape and a

babble of voices over his head; then he was on and off a horse; then he saw a haystack of which he hated the colour; then he walked and talked most politely with a young man. Actually his niece, who was with him, reported that he had sat on the ground saying repeatedly that it was bloody cold. She and a young man had tried to replace him on the horse and to get him sheltered behind a haystack. The selective memory was interesting. He wondered if the patients really had amnesia, or if rather they had dream-memories, consecutive but inconsequential.

Dr. T. TENNENT reported on 44 patients admitted to the Maudsley Hospital between 1923 and 1936 who had stayed in from two months to two years. Eighteen of them had been admitted between 1933 and 1936. Four had proved to be general paralytics. The remainder had shown the symptoms described in the paper. In some, hallucinatory experiences and bizarre ideas became prominent as the confusion disappeared and none of these had recovered. Two had developed a manic reaction and five a depressive one. Children had shown moral change and intellectual deterioration. In 25 cases the form seemed attributable solely to the accident; all had marked memory impairment, six being of the Korsakow type. Some ex-Service patients maintained the war was still on. All this group had recovered enough to be discharged and 22 had been followed up. Ten had remained well; nine were improved but had residual symptoms; two were in mental hospitals; and one was dead.

Prof. E. MAPOTHER thought that amnesia could not be identified with unconsciousness. He himself had had a concussion while playing football; a little after half-time he had suddenly found himself playing in the opposite direction to the one he last remembered. He had assumed he had had a kick in the first half and played automatically but was now not sure whether the kick had not occurred immediately before "waking up" and he had suffered from retrograde amnesia for 10 or 15 minutes. The gradual emergence from coma was a most important study. He had seen the sequence, described by Dr. Symonds, passed through in about an hour by a pedestrian knocked down by a car. There seemed a strong tendency to an orderly sequence.

Mr. HUGH CAIRNS remarked on the extraordinary persistence of this reversal process, with ultimate recovery. He had seen symptoms start five days after an injury, coinciding with the onset of sepsis and cellulitis, and disappear as they cleared up. Symptoms might also coincide with the exhibition of barbiturate drugs. There must be a great deal of compensation going on, so that the patient could cerebrate until some extra factor, like sepsis or drugs, complicated his state. He had known a patient write out his delirium afterwards; it had tallied with the ramblings noted at the time.

Dr. W. F. MENZIES protested against the misuse of the term Korsakow's psychosis in the absence of peripheral neuritis, on which Korsakow had insisted. He recalled three pre-war cases. One patient had been able to repeat fifty lines of the Odyssey at a time after being hit by a boom; he had never looked at Greek since leaving school twenty years before. A second patient, a dement, had fallen twenty feet on to asphalt and had suffered a fractured skull with permanent second and third cranial nerve paralysis, but had otherwise recovered rapidly and been no more demented after than before, but became very bad tempered. This indicated molecular change. Compound fractures turned epileptic or very bad tempered because there had been fibrotic changes and new blood-vessel formation. The third had developed cerebral abscess three weeks after colliding with a lamp-post; the surgeon had seen traces of meningeal disturbance when operating and had described the case in THE LANCET as "general paralysis without symptoms"! The patient had completely recovered, but had a persistent difficulty in recalling proper names.

Dr. E. GUTTMANN described work on twilight states in boxers. The transient disturbance of consciousness through knock-out was functional; post-concussional delirium suggested organic lesion. Some boxers felt the knock-out; some had seen it coming; others forgot the whole round.

Dr. A. W. PETRIE referred to analogous alcoholic states, and asked whether all speakers meant the same thing by post-traumatic dementia. Possibly the term might be confined to those who passed into permanent true dementia after injuries, and not applied to post-traumatic instability.

Dr. CLIFFORD ALLEN mentioned Janet's views on the structure of consciousness and said that patients had repetitive dreams with terror that something dreadful was about to happen. Accidents might be unconscious attempted suicide in manic-depressive personalities.

Dr. PURDON MARTIN said he grouped symptoms into amnesias; neuroses; negative symptoms, such as disorientation and confusion; positive release symptoms, such as restlessness, talkativeness, and noisiness—many of these patients had hæmorrhage in the cerebro-spinal fluid and all showed increase of protein—and late dementias. Some patients went into dementia after apparent recovery, and the good prognosis must be qualified by this fact. Observers had recently been finding excessive gliosis, especially in the frontal lobes. Elation was often present; it was to be regarded as a focal symptom, for it was often seen in frontal lobe lesions. It was associated with the symptom of jocularity and nearly always persisted throughout the illness. It might prevent realisation of headache and other symptoms.

Dr. HENRY WILSON spoke of the relationship between the psychosis and the duration of confusional symptoms. The confusion might be enough to send a schizoid personality into schizophrenia. Great unhappiness and anxiety might be caused by it.

Dr. SYMONDS, in reply, agreed that the patchy amnesia left a dream-like memory; the termination of traumatic amnesia was not abrupt. The high proportion of residual disability in Dr. Tennent's series might be related to the greater environmental stress in the hospital class and the different standard of employability. Retrograde amnesia was very brief—not usually more than half an hour. One patient had suffered a return of confusion on an attack of cystitis; the influence of sepsis was important. The post-traumatic dementia was not a mere instability but included a real failure to retain. Elation might accompany organic lesions in various parts of the brain.

NATIONAL BIRTH CONTROL ASSOCIATION.—A medical conference of this association will be held at 7, Drumsheugh-gardens, Edinburgh, on Friday, April 30th. At 3 P.M. Mrs. Helena Wright, M.B., will open a discussion on the technique of contraception, and at 8 P.M. Mr. J. R. Baker, D.Phil., lecturer in cytology in the University of Oxford, will speak on recent advances in the scientific study of chemical contraception. Further information may be had from the headquarter's organiser of the association, 26, Eccleston-street, London, S.W.1.

REVIEWS AND NOTICES OF BOOKS

Textbook of Medicine

By CHARLES PHILLIPS EMERSON, M.D., Research Professor of Medicine, Indiana University; Assistant Professor of Medicine, Cornell University (Ithaca). London: J. B. Lippincott Company. 1936. Pp. 1296. 36s.

THE issue of a large new text-book of medicine prompts the question, "Is there something here that is not to be found in the standard books?" One answer here is that Prof. Emerson has tried to set the clinical behaviour of disease in the forefront of his presentation. The incidence, and the symptoms and signs of a disease come early in its description, being the basic facts of medicine; morbid anatomy, bacteriological and biochemical findings follow on, so that it may be seen just how far they elucidate disease—and how far they fail to do so. This is no fundamental departure from the common sequence, but rather a shifting of emphasis, setting less store by the contributions of laboratory science, and showing how medicine is still in great part a lore of disease and an art founded on generations of experience. Another answer is that this book is a bigger one than most of its fellows. The clinical descriptions are comprehensive, and little historical sketches, and even biographical notes on great men, are included. Modern scientific work relevant to each subject is not ignored but is cited, often in smaller type or as a footnote, and reference is made to important original publications.

The author's style has character to it; he is always clear and succinct, but is fond of tricks of inversion and apposition whose slightly stilted effect is often rather telling. Choice of type and general arrangement are good, but misprints, usually mistakes in spelling, are numerous enough to be irritating. There are no illustrations. An immense labour must have gone to the writing of a book so fully documented, and much of that labour has, in the nature of things, been spent on books rather than on patients. This leads inevitably to some distortions, of which the statement that in the diagnosis of pulmonary tuberculosis, "when the clinical findings are inconclusive the X-ray pictures are likely to be even more so," is a surprising example. But it is clearly impossible in these days for a text-book of medicine to be informed throughout by detailed first-hand experience. Few could have performed so well as he has the task which Prof. Emerson set himself, and many students, qualified and otherwise, should find his work of great value.

L'infection bacillaire et la tuberculose

Fourth edition. By A. CALMETTE. Revised by A. BOQUET and L. NÈGRE, Chefs de Service à l'Institut Pasteur de Paris. Paris: Masson et Cie. 1936. Pp. 1025. Fr.175.

Calmette made many contributions to the study of tuberculosis in the course of a busy life, but probably none was more brilliant than the text-book which has now reached its fourth edition. Its well-balanced exposition of the subject, its breadth of outlook, and its lucidity of expression have all contributed to make this work classic. Dr. A. Boquet and Dr. L. Nègre in their revision have been mindful of the tenets of their late colleague, and have brought the work up to date without deviating from the original point of view or changing the personal note. As far as possible footnotes indicate which of the two editors is responsible for the new material.

More than one hundred pages have been added, and the book is now bound in a serviceable black cloth board cover which is a great improvement on the old paper one. The new sections include fresh descriptions of recent improvements in the clinical pathology of tuberculosis, such as the technique of gastric lavage and various new culture media. Chapters have been inserted on the differentiation of human and bovine strains, and on avian strains, by Dr. Boquet, as well as a section dealing with the dissociation of colonies which is demanding much attention at the present time. Dr. Nègre has enlarged the chapter on the ultra-virus of tuberculosis, whilst maintaining the general thesis concerning its existence. The sections dealing with B C G vaccine, which was Calmette's last great contribution to the study of tuberculosis, have been expanded to include new work. It must have been difficult, especially here, to know what to leave out and what to insert, but it seems a pity that old statistics on the fate of children born in tuberculous households should have been used where modern figures are available—notably the figures quoted for London on p. 953 and for England on p. 949. These are but small blemishes in a book which has earned and will continue to earn the gratitude and respect of all students of tuberculosis. It is noteworthy that the only English version of this work is that which W. B. Soper and G. H. Smith translated from the second French edition and published in America in 1923. This new edition merits translation.

Towards Peace of Mind

By KARL M. BOWMAN, M.D., Chief Medical Officer, Boston Psychopathic Hospital. London: George Allen and Unwin Ltd. 1936. Pp. 278. 6s.

THIS volume stands midway between a popular exposition and a text-book suitable for students. Its outstanding virtue is to combine a sound appreciation of heredity and neurology with an accurate and dispassionate exposition of Freudian psychopathology. While numerous references are made to recent advances in the study of the nervous system and of the mind, the aim of the book is never lost sight of and the pursuit of mental health is illustrated by theory, clinical examples, and therapeutic advice. The book can be strongly recommended to all practitioners who want a scientific and human exposition of modern psychological medical aims.

Operative Surgery

Second edition. By ALEXANDER MILES, M.D., F.R.C.S. Edin., Consulting Surgeon, Royal Infirmary, Edinburgh; and D. P. D. WILKIE, M.D., F.R.C.S. Edin. and Eng., Professor of Surgery, University of Edinburgh. London: Humphrey Milford, Oxford University Press. 1936. Pp. 631. 21s.

IN this edition the text has been completely revised, and the revision has been done well. In all the main things the teaching appears to be sound, but a few procedures might have been eliminated, and naturally some advice is given with which all

will not agree. It does not seem necessary, for instance, to mention the use of bone chips or wax or sponge for filling a septic bone cavity. Again, for stopping a cavity in the head of the tibia the use of the gastrocnemius is more crippling than that of the sartorius. We are told (p. 121) that the shaft of the humerus can be exposed by an incision "made through the appropriate muscular interspace," without specifying what this space is. The omissions include that of the occipital approach to the fifth nerve. But the extraordinary amount of information given is nearly always good and is invariably sponsored by some eminent authority. No student up for a higher surgical examination will go wrong if he hands out the teaching of this book to his examiners.

Clinical Handbook for Residents, Nurses, and Students

Second edition. By Members of the Staff of St. Vincent's Hospital, Sydney. Edited by V. M. COPPLESON, M.B., Ch.M., F.R.C.S., and DOUGLAS MILLER, F.R.C.S., F.R.A.C.S. London and Sydney: Angus and Robertson. 1936. Pp. 205. 6s.

THIS is a book of instructions for the medical student or the resident touching the hundred and one things that he must learn to do with his hands, such as sterilisation, use of needles, collection of specimens for pathological examination, giving anæsthetics, examination of urine, and so forth. It includes sections on the nursing and management of ophthalmic, ear, nose, and throat and gynæcological cases; the treatment of common skin conditions and of poisoning; preparations for X ray examination; the use of plaster, and various other topics. Only the routine practice at St. Vincent's Hospital is described, and the descriptions are simple, clear, sound, and practical; blood transfusion, for instance, is given with citrated blood, a funnel, and a tube, and no other method is mentioned. Not every hospital takes the trouble to see that its students are well trained in these routine matters of technique, and St. Vincent's Hospital is to be congratulated on providing its residents, present and future, with such a comprehensive and workmanlike manual.

Fundamentals of Bacteriology

By MARTIN FROBISHER, Jr., B.S., D.Sc., F.A.A.A.S., Associate in Bacteriology, Johns Hopkins University London: W. B. Saunders Co. 1937. Pp. 474. 14s.

EVEN the bacteriological enthusiast, proud of his subject and convinced of its educational value might be staggered by the opening words of the preface of this little book: "With bacteriology in its present state of development, no one can be said to have acquired a complete cultural education who remains uninformed concerning the unicellular fungi of the class *Schizomycetes*." This certainly argues a very broad or a very narrow conception of the "complete cultural education," it is hard to decide which. But the author's later modification of the statement, that a knowledge of bacteria "not only increases one's general usefulness, but greatly broadens his view of life and sharpens his appreciation of the subtlety of nature" is one that (barring its verbal construction) will be endorsed by everyone familiar with the subject. It is to introduce bacteriology to the general but cultured reader that Dr. Frobisher has written his interesting and accurate little book. The subject is well set out in historical perspective and the many activities of bacteria in nature beyond their pathogenic rôle are attractively described.

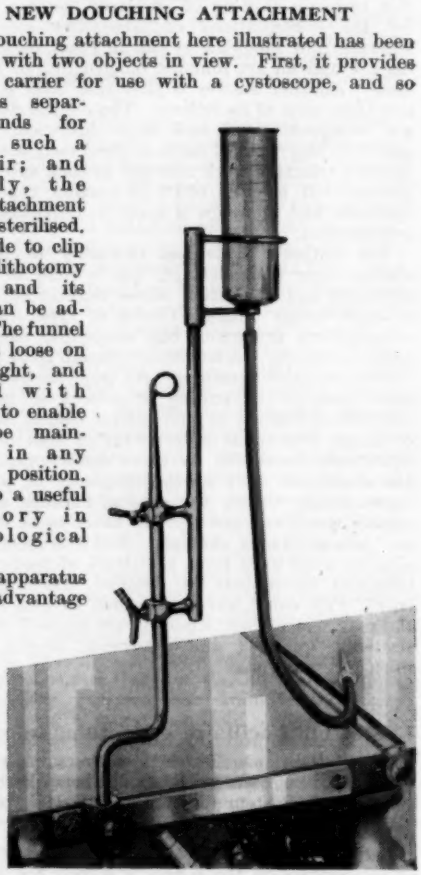
Within its scope it is one of the best introductions to general bacteriology we have seen and it is just the kind of book which a student of medicine who has become interested in bacteriology for its own sake might profitably read.

CORRIGENDUM.—"What is Osteopathy?" The authors of this book, which received appreciative notice in our columns last week, are Dr. Charles Hill, deputy medical secretary, British Medical Association, and Dr. H. A. Clegg, deputy editor, *British Medical Journal*. Mr. H. G. Wells contributes a preface.

NEW INVENTIONS

A NEW DOUCHING ATTACHMENT

THE douching attachment here illustrated has been designed with two objects in view. First, it provides a lotion carrier for use with a cystoscope, and so eliminates separate stands for holding such a reservoir; and secondly, the whole attachment can be sterilised. It is made to clip on to a lithotomy crutch, and its height can be adjusted. The funnel carrier is loose on the upright, and fitted with "dogs" to enable it to be maintained in any desired position. It is also a useful accessory in gynæcological work.



The apparatus has the advantage of being portable, and can be used on any table that has a suitable lithotomy crutch pole. It has been made for me by Messrs. Allen and Hanburys, London, W.1, to fit the St. Bartholomew's operating table.

CHARLES E. KINDERSLEY, F.R.C.S.,
Surgeon to the Royal United and Roya Mineral Water Hospitals, Bath.

THE LANCET

LONDON: SATURDAY, APRIL 17, 1937

THE FUTURE OF OUR POPULATION

THE observant man can hardly be blamed if he has a feeling of bewilderment, tempered perhaps by scepticism, when he considers the figures relating to population. For years economists and other experts have made the spectre of over-population dance before his eyes. He has been told that poverty and misery must be reduced by volitional control of the size of the family—that the "planned" family is the ideal at which we must aim. There seems, moreover, ample justification for the argument. He knows that the population of our country has shown a phenomenal increase, that it has multiplied nearly fivefold in rather more than a century, and that it now depends largely upon distant sources for its food-supplies. Looking, even casually, around him he seems to see additional evidence on every side; there is a continual encroachment of the town upon the country, building activity in every direction, town-planning schemes in operation or visualised, traffic congestion on road and rail affecting his everyday life, depressing figures of unemployment, unsatisfactory diets amongst the larger families in the poorer strata of society, and an annual excess of births over deaths so that the numbers in the country continue to increase.

And yet the expert now tells him that we are seriously threatened with depopulation. In the daily press, and in books and pamphlets, he is warned gravely that our population must shortly follow a downward path, that unless people soon begin to have more children we shall be threatened with extinction, that a Royal Commission ought at once to be appointed to "discover the facts and to formulate a population policy."[1] What is he to believe? What is the explanation of the seeming paradox? An excellent attempt to answer these questions in simple terms has now been made by the Population Investigation Committee. This body, formed last autumn under the chairmanship of Prof. A. M. CARR-SAUNDERS, includes representatives of the British College of Obstetricians and Gynæcologists, the Medical Research Council, the Royal Economic Society, the Society of Medical Officers of Health, the British Population Society, the Eugenics Society, and a number of medical and economic authorities. It was formed to examine the factors influencing contemporary trends of population in England and Wales with special reference to the fall of the birth-rate. Its first task has been to consider the recent history of our population, to determine how its prodigious growth has taken place, what effect the declining fertility-rate is likely to have upon its future size and constitution, and what have been the basic causes of that fall in fertility. The results of these inquiries are set out in a pamphlet prepared for the committee by Dr. C. P. BLACKER and Mr. D. V. GLASS.[2] When the population began to increase towards the end of the eighteenth century it is possible that there was some rise in fertility, but the evidence is scanty. Throughout the nineteenth century the rise was certainly not due to an increasing birth-rate but to a falling death-rate. Between 1838 and 1913 the births annually exceeded the deaths by about 300,000; in the decade 1914–23 the excess was only 220,000 a year; in 1934 it had fallen to 121,000. Though there is likely to be an excess in 1937 it will be still smaller, and in another five years, or less, that excess will have vanished. One result of this falling birth-rate is the raising of the average age of the population. In time this must lead to an increase in the crude death-rate—although with further advances in medical science and public health the death-rates at ages may continue to decline. A population that contains a large proportion of old people must have a relatively high death-rate and it is on this rate, in conjunction with the fertility-rate, that the growth of the population must depend. With an ageing population we clearly cannot depend upon favourable changes in the death-rate to maintain our numbers. To take a simple example, Dr. G. F. MCCLEARY has shown[3] that the effect on population growth of an entire elimination of infant mortality would be completely neutralised by a reduction in the birth-rate of less than 1 per 1000. It is mainly on fertility that the future population must depend, and although at present the birth-rate remains higher than the temporarily lowered crude death-rate, it is now well below the replacement-rate. It is, in fact, to this rate that we must look, and the figures of the 1931 census of England and Wales show that persons aged 20–35 were more numerous than the young persons in the age-groups 0–15: in other words, there were in 1931 not enough young people to replace the men and women twenty years older than themselves. With the aid of a relatively new statistical technique the level of this replacement-rate can be measured—by an index known as the net reproduction-rate. Briefly this expresses the number of women who in the next generation will replace the women of reproductive age in this generation. In the words of BLACKER and GLASS:

"if the women of reproductive age in this generation, who are mothers of children are having sufficient girl children to replace themselves as well as those women of their age who are childless, the net reproduction-rate is 1 or unity and the population is maintaining itself. If, allowing for deaths, they are not having enough girl children to do this, the net reproduction-rate falls below unity and the population is not replacing itself; if they are having more girl babies than is necessary

[1] *Times*, April 5th, 1937.

[2] The Future of Our Population. By C. P. Blacker and D. V. Glass. Issued by the Population Investigation Committee, 69, Eccleston-square, S.W.1. Pp. 31. 6*d*.

[3] The Menace of British Depopulation. By G. F. McCleary, M.D. London: George Allen and Unwin. 1937. Pp. 144. 4*s*. 6*d*.

for this purpose, the net reproduction-rate is above unity and the population will increase."

Dr. ENID CHARLES [4] has calculated that in 1933 the figure for England and Wales was only 0·734, or according to the fertility- and mortality-rates of that year 1000 women of reproductive age were producing only 734 girl children who would grow up to replace them in the next generation. The figure is below unity in most of the countries of western Europe and, as MCCLEARY emphasises, amongst the British-born in the Dominions. It is easy, though laborious, to calculate the downward path along which this present position must lead us, and an example of the calculation, by Mr. C. A. GOULD, is given on p. 944. Naturally the further ahead we endeavour to prophesy the more we may deviate from the truth. But even if fertility ceases to decline below its present level we are faced with a declining population in the near future, and with a population that some believe will deteriorate in quality as well as quantity, through the effects of differential fertility.

As BLACKER and GLASS admit, many good arguments can be urged for preferring a stationary or a slowly growing population to a rapidly expanding one; but a declining population is quite another matter. Only an increased fertility can avert it. Is that a likely event? Are there any means of encouraging it? Unless we know the reasons for the falling birth-rate we clearly can take no steps to arrest its decline. In the second section of their pamphlet BLACKER and GLASS devote themselves to this subject. Sterility they think is not increasing and they lay more stress on social and economic reasons—the difficulty of parents supporting more than a small number of children, of finding them suitable employment as they reach maturity, of giving them and themselves the social advantages, comforts, and standards of life that they desire. Under psychological reasons they refer to the parental instinct that is satisfied by one or two children—"when parenthood is being increasingly planned, the strength of the desire for children as measured by the number of children by which it can be adequately satisfied, comes into an entirely new prominence as a biological factor to which is attached the clearest survival value." The uncertain political and social condition of the world must also play its part. Fertility cannot be raised, they conclude, unless there is a change of attitude of the kind they call "psychological" about the family, unless people can somehow be inspired to *want* children. MCCLEARY is much of the same mind. Though he is satisfied that economic factors are at work, he thinks that the really important causes of depopulation lie deeper in the conditions of modern life. "If babies are not to be had for love they are not likely to be had for money." Certainly the efforts by the latter means taken in Germany and Italy have been attended by no striking success,[5] though the economic incentives offered may well have been too small. But if effective action is to be taken we must know more of the possible factors that are thought to influence people in restricting their families. This problem the Population Investigation Committee hopes to investigate, and an appeal is made for funds to enable it to do so. There are two lines it wishes to follow—namely, statistical analysis and direct inquiry. Under the first, calculation may be made of the extent to which people living in different regions, urban and rural, and working in different industries and occupations, are replacing themselves. Under the latter, by questionnaire, further light may be thrown on differential fertility, on medical causes of infertility, on the degree of success attending contraception, on the effects of uncertainty of employment, on the "psychological" factors involved. Perhaps, as some have argued, there is a law of population growth or there are, as BROWNLEE believed, changes in germinal vitality that we cannot influence. Perhaps, as others believe, "the innumerable distractions of modern life are far more tempting to the average man and woman than is the bringing up of children," the only remedy for which is the "reawakening of the race as a whole to its responsibilities as a civilising factor." [6] The problem is exceedingly complex, but of vital national importance if "western civilisation is not to go the way of Greece and Rome to decay and death." That fear some may think unduly alarmist, but the pamphlet under review shows clearly the experts' reasons for disquiet. It gives no one an excuse for remaining ignorant of the situation.

[4] The Twilight of Parenthood. London. 1934.
[5] The Struggle for Population. By D. V. Glass. Oxford. 1936. See *Lancet*, 1936, 2, 441.

NEW METHODS OF IMMUNISATION AGAINST DIPHTHERIA

To protect a particular child against diphtheria is comparatively easy: there is a wide choice of immunising agents and methods which are all reasonably satisfactory for the purpose. To protect a community is far less simple, since the method adopted must be uniform, must give as complete and lasting protection as possible, must not produce serious reactions, and must be cheap and manageable. The dilemma is well known and no way of circumventing it has been found. The difficulty is that, on the one hand, a single injection either fails to give immunity in a satisfactory proportion of cases or causes too severe reactions, while on the other hand, mothers do not like to bring their children for a series of injections, particularly if these have to be repeated at intervals in order to keep the antitoxin at a suitable level.

A possible way out was demonstrated by Prof. CLAUS JENSEN, director of the department of biological standards at the State Serum Institute of Copenhagen, in a paper given to the epidemiological section of the Royal Society of Medicine on April 9th. The method he adopts, which is supported by many years' work and much experiment, is a single subcutaneous injection of Schmidt's

[6] *Daily Telegraph*, April 6th, 1937.

purified aluminium-hydroxide toxoid followed by intranasal instillations of purified toxoid dilution. His conclusions are based entirely on quantitative estimations of antitoxin, which clearly afford more accurate information than, for example, skin reactions. Various series of rabbits, children, and adults first had their natural antitoxin quantitatively determined and then were divided into four groups according to the amount of circulating antitoxin—i.e., less than 0·0005, less than 0·01, less than 0·10, and more than 0·10 antitoxin unit per c.cm. Four weeks after the single injection of purified $Al(OH)_3$-toxoid the groups were redetermined, and this was done again after 6 or 3 nasal instillations at stated intervals. The results were ingeniously shown by what Dr. JENSEN calls "antitoxin spectra"—i.e., coloured histograms resembling the appearances seen in spectroscopy. In all three groups (rabbits, children, and adults) the results appeared to be excellent, the effect of the intranasal instillations being greatest in those who gave a poor response to the subcutaneous injection. There were no reactions to the nasal instillations in children but in adults (probationer nurses) transitory headache, nausea, or fatigue were occasionally experienced. Of the children 100 per cent. developed more than 0·01 unit of antitoxin six weeks later and 96 to 100 per cent. developed 0·10 unit or more. Nine months afterwards the immunity appeared to have fallen off considerably, but the response to nasal reimmunisation only after twelve months was even better than to the original combined treatment. In the group of 319 probationer nurses, 94 per cent. developed more than 0·01 unit and 85 per cent. more than 0·10 unit, while 1 per cent. were refractory. Dr. JENSEN is sufficiently convinced of the value of his method to recommend its adoption for all children without preliminary or control Schick-testing. Mass immunisation of the child population against diphtheria has not been attempted in Denmark hitherto, the experiments recorded being confined to schools and institutions. This is partly owing to the rarity of epidemics of diphtheria in Denmark and partly to deliberate abstention until the most efficient and practical method had been determined. But diphtheria is prevalent in many of the surrounding countries and the proportion of natural immunes in the child population is low—far lower than in England for example—and the danger is therefore considerable. Dr. JENSEN hopes that the Department of Health will now start a drive for immunisation and thinks that by efficient propaganda nearly the whole of the children of Denmark—some 700,000—might be immunised by his method within about a year and the immunity kept up by repeated annual intranasal instillations.

In sum, several definite advantages may be claimed for JENSEN'S method, and, since present methods are not entirely satisfactory, bacteriologists and public health authorities should examine his claims with care. Whether in England it would be thought advisable to entrust the intranasal instillation to the mothers is doubtful; perhaps the health visitor would be a more suitable agent. But anything which smooths the path between academic and practical immunology is welcome and the careful work done in Denmark, as well as its attractive presentation, demands serious attention.

THE MEDICINE DUTIES AND THE CHEMIST

THE Select Committee on the Medicine Stamp Duties was somewhat ruthless in its recommendations. It was natural that its report should display impatience at the continued retention on the statute book of legislation like the Medicines Stamp Act of 1812 with its list which begins with Adam's Solvent, Addison's Re-animating European Balm, and Aethereal Anodyne Spirit, and ends with York Medicinal Preventive Lotion and Zimmerman's Stimulating Fluid. The committee, of course, was concerned with the revenue aspect not with pharmacology; and it is reasonable to suppose that the CHANCELLOR OF THE EXCHEQUER will take no step in his forthcoming Budget without careful consultation with the interests specially affected. Strong protests are meanwhile being made against the proposals in the committee's report. The recommendation that, with a few exceptions, all drugs and medicaments, herbs, disinfectants, and soaps should be made liable to a duty based on the retail selling price is a proposal for a novel and irritating form of sales tax. It is urged that the State should not single out for taxation those medicinal substances which are used by persons in ill health. The weapon of taxation, it is said, will be employed to discourage a proper statement upon labels and accompanying literature of the conditions in which a medicine is to be taken. Manufacturers will cease to have any inducement to disclose in their labels the composition of their medicaments, with the result that we shall return to the abuses of "secret" remedies. Prescribing over the counter would be embarrassed; the "last surviving privilege of the pharmaceutical profession," the chemist's right to prescribe and sell his own medicine to his customers without having to stamp it, would disappear. The consultative value of his training would be belittled. If the customers ask for an ounce of castor oil, they will get it at the normal price of so much oleum ricini. But if they ask him to suggest an aperient, or if they mention castor oil and ask his advice about the dose, he will have to affix a stamp and pay the duty.

The general position of the registered pharmacist seems to be threatened by the committee's report. It observes that the Act of 1783 was intended to tax the quack and to exempt those "bred to the profession of physician or apothecary." But, observes the committee, qualified chemists have in effect obtained the privilege of selling the bulk of their ready-made preparations duty-free, while precisely the same preparations, if sold by a grocer, must pay duty. The committee seems to doubt the benefit of specialised pharmaceutical training. Is there no safeguard to the public in the presence of a registered pharmacist on premises where medicines are sold? The committee apparently

thinks this protection is illusory—at any rate on premises where there are large sales of ready-packed medicines. It may be doubted if Parliament or the public would share this very depreciatory opinion.

IMPROVEMENT OF POSTURE

Mr. PHILIP WILES has chosen a good moment for presenting his views on postural deformities—the subject of his Hunterian lecture published in our present issue. At a time when much is being said about the need for improved physique and the Government is prepared to spend money to this end, the nation, like other sick persons, may suffer from contradictory advice. It is therefore important, wherever possible, to collect information that will fill the gaps in our knowledge, so that there may be no doubt as to what are the fundamentals of physical efficiency and the methods by which they may be attained. When "physical training" is going to be made available for every child and adult in the country, it is necessary for example that zealous organisers should not remain ignorant of the dangers of haphazard application of gymnastic exercises to anyone and everyone. Physical exercises, as LEDENT [1] puts it, should be regarded as a drug; and no drug has equally beneficial effects on all patients at all times and in the same dose.

In his lecture Mr. WILES brings together facts gathered during many years by many workers, both here and abroad. To these he adds observations he has made with an ingenious gauge for measuring the pelvic tilt. These observations, though few in relation to such surveys as that made by the Board of Education in 1935, will be found very interesting. He rightly points out that as the pelvis is the base of the spine, its axis has a fundamental effect on the attitude of the parts above. The question is whether he does not pass rather too lightly over the influence of the parts below—the knees and feet for example, which form the actual pedestal for the human machine. Although he accepts as correct GOLDTHWAIT'S straight axis for the human body, passing through mastoid, shoulder, hip, front of knee, and ankle, his photographs of "normal" persons would not coincide with GOLDTHWAIT'S satisfactory posture. In regard to posture, more perhaps than anywhere else in medicine, it is difficult to get any two practitioners to agree to the same definition of "normal" and "efficient." Our ideal for the human race is by no means synonymous with survival-value in evolution. The biologist points out that the amœba has survived from primeval times and is biologically as efficient as the most brilliant scientist. Physical strength does not necessarily imply strength against disease; and on the other hand the weedy slum-dweller, with his comparative efficiency in the war against bacteria, might easily be bowled over by an overdose of "physical training." Though Mr. WILES refers to it, he does not perhaps put quite enough emphasis on the necessity of balancing the prescription of exercise with a correspondingly weighty dose of rest. This is implied however in his insistence that posture is a function of the central nervous system as a whole, and that its improvement depends on the patient's coöperation and on the restoration of a series of reflexes whose pattern has been disturbed by such disorders as rapid growth, toxæmia, or anxiety. The emotional factors influencing posture can scarcely be exaggerated; but if we were to argue too closely from the physical to the mental, the sight of any gathering of ordinary people—even a medical audience—would bring despair for the intellectual prospects of Britain!

Not all will agree with Mr. WILES in making light of the influence on growing tissues of such external factors as violins and school-desks; HUNTER demonstrated the plasticity of adult bones in response to the strains of various trades. He is on firmer ground in condemning attempts to "stretch" muscles and ligaments by force, since it is now recognised that muscles can only be lengthened satisfactorily by encouraging their reflex relaxation, as their antagonists contract; while ligaments yield best to persistent traction in their long axis. It should not be forgotten that lying on the ground provides just that resistance to the flexors, and support for the extensors, which Mr. WILES recommends as the basis of exercises for correction of posture.

[1] Ledent, R., Les erreurs gymnastiques, *Scalpel*, April 3rd, 1937, p. 430.

BRUCELLA MELITENSIS IN THE UNITED STATES

EXCEPT in the hog-raising district of the middle west, where infections with *Brucella suis* are common, undulant fever in the United States is nearly always due to *Br. abortus*, which comes directly or indirectly from the cow. *Br. melitensis* infections have so far been restricted to the south-western States where some goat's milk is drunk. From a survey by Miss Alice C. Evans,[1] of the National Institute of Health, it seems possible that infections with the *melitensis* type may be rather commoner than has been apparent, and that infection may sometimes be distributed by cow's milk. Using the quantitative absorption technique she examined sera from 27 patients having a titre of 1/160 or over. The results suggested that 14 were infected with the *abortus* and 13 with the *melitensis* type. Of the patients in the latter group 5 lived in North Carolina and 6 in Texas—both States in which goats are few. It is doubtful however whether this justifies the conclusion that these patients must have been infected from cattle. That cattle may be infected with *Br. melitensis*, and that human beings may contract undulant fever from cow's milk containing this organism, has been amply demonstrated by Taylor and his colleagues at Montpellier. But the evidence contained in Miss Evans's present paper is only circumstantial. Cows have never been found to be infected with the *melitensis* type except when running with goats, and the risk of their being infected in areas free from goats seems slight. In this country indigenous *melitensis* infection has never been satisfactorily demonstrated.

[1] Evans, A. C. (1937) *Publ. Hlth Rep., Wash.* **52**, 295.

ANNOTATIONS

AN INTERNATIONAL ASSOCIATION OF THE MEDICAL PRESS

A MOVEMENT was projected from Milan last summer for the organisation of an International Association of the Medical Press and the preliminary statement was to the effect that the first president would be Dr. Hans Spatz, the editor of the *Münchener Medizinische Wochenschrift*; the first treasurer Dr. Benno Schwabe; and the secretary-general Signor Santo Vanasia, giving his address as Casella postale 3395, Milan. Among the council the names were printed, without any previous sanction, of the editor of *The Lancet* and the editor of the *Journal of the American Medical Association*, together with the editors of a dozen or fifteen other medical journals, who may or may not have given permission. The editor of *The Lancet*, not being satisfied that anything practical at the present stage of European politics could develop from the movement, asked that his name and that of *The Lancet*, placed on the circular without approval having been asked, should be removed. Dr. Fishbein, editor of the *Journal of the American Medical Association*, being communicated with, said that his name and that of his journal also appeared on the circulars without any authority, and he enclosed to us a copy of a letter in which he had protested against the treatment he had received. Dr. Fishbein was more fortunate than the editor of *The Lancet*, for he obtained a courteous statement from Signor Santo Vanasia, the source of all the communications, in the following words: "I was merely showing the basis for my future work in case of acceptance. According to your wishes I cancel my previous indications although I have confidence that your ideals agree with mine." The editor of *The Lancet* not only received no assurance that the references to the paper and to himself would be cancelled, but finds that his name and that of *The Lancet* still remain on the circulars. In the last circular received, the name of Dr. Hans Spatz is still given as president of the projected Association and that of Dr. Benno Schwabe as treasurer. We have now received a communication from Dr. Hans Spatz that his name has been used without his authority and that, in spite of repeated protests, it has until now not been expunged from the lists. He adds also that false announcements of his appointment as president have been made in the German daily press. Further, Dr. Spatz has been informed by Dr. Benno Schwabe that the printed statements of his position as treasurer to the movement have been made without his consent. Dr. Hans Spatz has published in the German press the withdrawal of his name from the Association, with a criticism of the extraordinary procedures of the secretary-general. In publishing this repudiation by *The Lancet* of any connexion with the movement, we are asked by Dr. Spatz to associate his name with our protest.

DEFICIENCIES IN ULCERATIVE COLITIS

ONE of the most interesting aspects of biological processes is the way in which a specific effect, however brought about, always tends to set up the same train of events. If a number of causes bring about the specific effect, the resulting train of events may be common to a number of conditions, although modified and supplemented in each of them by the particular exciting cause. The appreciation of these "syndromes," which are common to a number of diseases is of enormous importance in theoretical medicine; although practical medicine—the slave of diagnosis—depends more upon the recognition of the particular response. The rise of body temperature (and its inevitable sequelæ) which accompanies many toxic processes is a good example of a general response that may be produced by many different stimuli. Another example is salt deficiency which is common to Addison's disease, pyloric stenosis, excessive sweating, diarrhœa and vomiting, and (according to Welch, Adams, and Wakefield[1] of the Mayo Clinic) ulcerative colitis. A third example, less often recognised, is the response of the body to a forced and continuous loss of protein material. Such losses are met with in, for example, pregnancy, lactation, chronic parenchymatous nephritis, and (as is also demonstrated by Welch and his colleagues) ulcerative colitis. In all of these conditions the blood-urea tends to be low, indicating a small katabolism of amino-acids and suggesting that all the available ones are being used for the synthesis of the protein which is being "lost"; the urea nitrogen in consequence forms very much less than the normal 70–80 per cent. of the total nitrogen leaving the body. Where this happens it is clear that the treatment should include high protein feeding; and while the success of a generous protein intake in chronic parenchymatous nephritis is well known and the value of protein in pregnancy and lactation is also accepted, the Mayo Clinic workers do well to point out the necessity for a liberal protein diet in ulcerative colitis.

FLUORINE POISONING

MANY of our readers will recall the "fog disaster" which occurred[2] in the valley of the Meuse above Liége early in December, 1930. Within a few days several thousands persons suffered from an acute pulmonary affection, and 60 lost their lives. A commission of inquiry was set up which came to the conclusion that the disaster was due to the accumulation of waste factory products, in the air of the narrow steep river valley; a blanket of cold fog during windless weather acting like a closed roof to the valley. The commission suggested that sulphur dioxide (or its derivatives) was the chemical substance responsible. Those who were familiar with the physiological effects of SO_2, and especially those who have experienced considerable or prolonged exposure to this gas, were not impressed by the findings of the commission on this head. Dr. Kaj Roholm of Copenhagen now surveys[3] the whole problem in the light of more recent knowledge about the toxicity of fluorine and its compounds, and makes out a strong case for the belief that fluorine and not sulphur was the peccant agent. Here was a narrow deep valley, a dense pall of almost stationary fog, and in two places in the valley (at Engis and in the Sclessin-Seraign area) a number of factories (15 in all) throwing considerable quantities of fluorine into the air. It may be unlikely that such a combination of circumstances will arise in this country, but the possibility that chronic fluorine poisoning may be occurring cannot be so easily dismissed.

Fluorine poisoning may be produced as a result of industrial processes, from the ingestion of fluorine-

[1] Welch, C. S., Adams, M., and Wakefield, E. C., *J. clin. Invest.*, January, 1937, p. 161.

[2] See *Lancet*, 1930, **2**, 1305.

[3] A paper read before the Danish Society for Internal Medicine, *J. industr. Hyg.* March, 1937, p. 126.

contaminated soil or water, or occasionally (as in Iceland) it may arise from the dust of volcanic eruptions after it has settled on the soil. A number of industrial processes make use of raw materials containing fluorides: (1) Blast-furnaces, steel and metal works; Dr. Roholm estimates the world's yearly output of calcium fluoride (fluorspar CaF_2) at 200,000–300,000 tons of which 80 per cent. is used in blast furnaces. During the smelting of iron and steel, silicon tetrafluoride escapes into the air. (2) Glass and ceramic manufacture. (3) Zinc smelting: zinc ore usually contains fluorspar. (4) Superphosphate manufacture: phosphatite contains fluoride. (5) Chemical works. In the neighbourhood of some of the factories in the Meuse valley, it was observed that glass rapidly lost some of its transparency. Plant life was damaged around some of the factories. Animals fed upon contaminated herbage suffered from dental and bone diseases or died with emaciation and cachexia.

In acute fluorine poisoning resulting from breathing contaminated air, the symptoms and signs are those of an acute pulmonary œdema, similar to that seen after exposure to certain "poison gases." In chronic poisoning (whether the "fluorine" is air- or water-borne), the characteristic symptoms are mottling of the enamel of the teeth; bony changes, (*a*) either a diffuse osteo-sclerosis with deposits in the ligamentous insertions of the muscles, or (*b*) bony degeneration and softening (when the poisoning is more severe); general wasting; anæmia and cachexia. Now that attention has been drawn to this matter, no doubt a careful study of the possible risk in our industrial areas will be made. Dr. Roholm insists that factories giving off fluorine compounds should be required to take measures for effective removal of the flusrine compounds from chimney smoke.

CAROTID SINUS FAINTING ATTACKS

IF medical problems often stimulate physiological research, physiological discoveries often point the way to advances in medicine. The latter sequence is exemplified by the story of the carotid sinus. In the last ten years the physiologists, led by Hering and Heymans, have elucidated the function of this curious bulbous dilatation at the origin of the internal carotid artery, the walls of which, as well as the substance of the adjacent highly vascular carotid body, are furnished with numerous afferent nerve-endings. These endings are stimulated by the mechanical stretching of the sinus walls due to the pressure of its contained blood, and also (probably those in the carotid body) by certain chemical changes in the blood, such as carbon dioxide excess, oxygen deficit, and the presence of sodium cyanide in minute amounts. Nerve impulses from the stimulated endings ascend in the vagus and glossopharyngeal nerves to the medulla and give rise to certain well-defined reflex effects, notably slowing of the heart, splanchnic vasodilatation with fall in blood pressure, and increased breathing. In respect of blood pressure, the carotid sinus mechanism clearly supplements the earlier known depressor reflex from the aortic wall in counteracting excessive rise in aortic pressure and thereby regulating the general blood pressure and the blood-supply to the brain. As to respiration, some of the effects formerly attributed to the action on the respiratory centre of changes in the amount or composition of its blood-supply are now seen to be brought about by the carotid sinus mechanism.

Soma Weiss and his colleagues have lately looked to the carotid sinus as an explanation of some varieties of fainting attack in man, and they summarise their observations of the last few years in a recent paper.[1] If the patient's fainting attack can be reproduced at will by digital pressure over his carotid sinus in the neck, they argue that a hypersensitiveness of the reflex is the mechanism of the attack; the conclusion is supported by other evidence as well. They have investigated 57 patients showing this phenomenon, and they remark incidentally that many of them showed local anatomical lesions, such as tuberculous adenitis of glands near the carotid bifurcation, or athero-sclerotic lesions in the vessel itself. The induced fainting attacks fell into three groups. In the first a vagal effect predominated, with slowing or transient stoppage of the heart, which could be prevented by atropine. In the second, splanchnic dilatation and fall of blood pressure occurred, indicating a release of sympathetic vasoconstrictor tone as the chief reflex effect; adrenaline counteracted this, while small doses of nitrites accentuated it. In the third group carotid sinus stimulation apparently produced curious faints, with features suggesting amnesia, sleep, or cataplexy, which are more difficult to explain physiologically, since blood pressure and heart-rate were unaltered. The authors note that the patients subject to carotid sinus attacks often show evidence of what they call vegetative neuroses—"functional" symptoms such as constant fatigue, mental depression, palpitation, emotional instability. They could offer little evidence, however, that the carotid sinus was responsible for any symptoms other than the fainting attacks and phenomena directly associated with them. In 8 of 10 cases in which the carotid sinuses were surgically denervated, the syncopal attacks ceased but the other features remained unaltered. The authors conclude therefore that they have displayed a reflex physiological mechanism for a symptom hitherto classed as "functional" and often "neurotic," and they wonder how many more disorders of the same class, in the behaviour of the autonomic nervous system, may be amenable to similar explanation.

A SOUTH AFRICAN PROPRIETARY MEDICINES BILL

A Proprietary Medicines and Appliances Bill has been introduced into the South African Parliament which may have far-reaching results. It would make it an offence to print, publish, or distribute any advertisement of a proprietary article which is indecent or improper, or fails to state the manufacturer's name and address, or refers to a testimonial, or offers free treatment, or states that the article is a cure for any disease. The Bill goes further, indeed, than similar proposed legislation elsewhere, for it would penalise the use in advertisements of the words "professor," "doctor," "physician," or "surgeon." It forbids too any such advertisement which is "likely to conjure up in the mind of a reasonable man the fear of serious consequences from some trivial complaint." Finally, the advertiser must not by name or implication refer to certain diseases scheduled as incurable or requiring special treatment. There is an exception for appliances for deafness or rupture, but the list in the schedule includes alcoholism, appendicitis, blindness, cancer, deafness, diabetes, high blood pressure, infantile paralysis, malaria, pneumonia, sexual impotence, tuberculosis, and venereal diseases. If the Bill were

[1] Ferris, E. B., Jr., Capps, R. B., and Weiss, S., *Arch. Neur. Psych.* February, 1937, p. 365.

to be passed into law, it would of course affect British newspapers introduced into South Africa which contain forbidden advertisements of this kind. Even if it does not become law in its proposed form, the Bill will have offered opportunity for useful discussion and will give newspaper proprietors material for considering the imposition of voluntary standards.

ERADICATION OF TSETSE FROM RIVER AREAS

THE Colonial Development Fund has lately financed an interesting experiment in Kenya. By the expenditure of some £2400 an area of 4000 acres of highly fertile land, which had been derelict for thirty years owing to sleeping-sickness, has been rendered safe for habitation. An account of the measures adopted has been written by Mr. C. B. Symes, medical entomologist, and Mr. R. T. Vane, tsetse field assistant.[1]

The great epidemic of sleeping-sickness which decimated Uganda between 1901 and 1906 spread to the eastern shores of the Victoria Nyanza, and the disease is still endemic on the coast and particularly in the Kuja river basin. Kaniadoto, a district in this area, was chosen for the experiment because surveys had shown a high incidence of trypanosomiasis. The dense bush along the river and its tributaries is infested with *Glossina palpalis*, and the population has been driven to the higher ground which is largely waterless and destitute of trees. These conditions have compelled the people to go down to the streams for water and wood and to water their herds, and in doing so they could not avoid contact with the heavily infested bush, which varies from 100 yards to a mile in width. The essential feature of the experiment was a piecemeal attack on the bush; the trees are chiefly acacia and thorn, but there is a mass of undergrowth and creepers. Five clearings were made, varying in width from 500 to 1050 yards, at the sites of the most used watering-places and fords. When the heavier vegetation had been burned out, the undergrowth and creepers were hacked down by gangs of natives. As soon as the five clearings had been made the attack was directed to the blocks of bush which had been left. These were systematically cleared of fly by the use of Swynnerton's screen-traps which were most efficient when the fly-density was high. In the later stages great and rapid progress was made by hand-catching with nets. The efficiency of these measures may be judged by the fact that in one block nearly 40,000 tsetse were captured. The glossina is big enough to be marked and at different times some thousands of specimens, rendered identifiable by spots of oil-colour, were set free. Their recapture determined how far the clearings were effective, and it was noted that few flies managed to cross a cleared area 1000 yards wide. Other interesting details of the habits of the tsetse were also obtained; for example, it was found to be more active and more prolific during wet seasons. Among the labour force, which comprised an average of 90 natives, 5 cases of trypanosomiasis were recognised, but the men were immediately removed and treated and are now well.

The net result of the experiment is that eleven miles of river have been cleared of bush, and six square miles of highly fertile land have been rendered available for occupation. In June, 1935, 400 men, women, and children (93 families) were settled on the area, most of which is now under cultivation. Another three square miles have been cleared, but will not be safe until an extension has been made. Provided that cultivation is maintained the cost of keeping the cleared area "clean" will not exceed £75 per annum. A complete scheme for this district would probably require another six to eight years' work. Unfortunately the "block" method is not applicable to the coastal districts, and until some measure be devised for dealing with them we cannot expect a return of the prosperous conditions which obtained in this part of the Nyanza province before it was attacked by the trypanosome.

[1] The Eradication of *G. palpalis* from River Areas by the "Block" Method. By C. B. Symes and R. T. Vane. Nairobi Government Press. 1937.

SPEECH THERAPY

FORTUNATELY most of us learn to speak without effort, or at least the effort is not remembered. The vocal apparatus and its use are so complicated, however, that imperfect speech once acquired is difficult to correct, especially as the patients are most commonly either very young children, or over-anxious adults. The mental energy required to study the physiology of speech is greater than most medical students have to spare, and as far as doctors are concerned the subject has largely remained a mystery enshrined in very specialised clinics. Two monographs recently issued throw light on different aspects of the work of speech therapy. Miss Parsons writes charmingly.[1] The illustrated story of Mr. Tongue's walks to the houses of Mr. Soft Palate and Mr. Teeth, and his meetings with the Diphthong boys provides one example, among many, of how speech exercises for the young child may be made entertaining. The scientific part of the book is intentionally slight. The book is obviously written by a born teacher, and can be recommended not only to doctors who want to know the sort of thing speech therapists do (or could do), but to parents of children with speech defects. Miss McAllister's book [2] is a more weighty contribution to speech therapy, and will arouse more controversy. The two divisions of the book deal with stammering and with stuttering, the terms being used in very wide senses. For example all defects of articulation are classified under the heading stammering, even if these arise only on account of defective hearing. The descriptions of such cases suggest some confusion in the author's mind between the intensity and the pitch of sounds, and in respect of other physical factors in the problem. Experienced teachers of the deaf would certainly and rightly object to children with grossly defective hearing being left in a speech therapy clinic instead of being sent to a school for the deaf. Miss McAllister quotes statistics showing that 5·6 per cent. of 21,452 children in Dunbartonshire suffer from some kind of speech disability, and suggests that the incidence is similar elsewhere. On this account she pleads for a trained speech therapist on the staff of every school with over 400 children, believing that occasional attendance at a clinic is unsatisfactory. Another written contribution [3] to the popularisation of speech therapy has recently come from Mr. H. St. John Rumsey, who has corrected himself of stammering, and has had 15 years of experience in treating other people. He

[1] The Gateway of Speech. By Freda Parsons. London: Ginn and Co. 1937. Pp. 224. 7*s*. 6*d*.

[2] Clinical Studies in Speech Therapy. By Anne H. McAllister, M.A., Ed.B., Lecturer in Speech Training, Jordanhill Training College, Glasgow. London: University of London Press. 1937. Pp. 376. 15*s*.

[3] Your Stammer and How to Cure It. By H. St. John Rumsey, M.A., Speech Therapist and Lecturer in Speech Therapy at Guy's Hospital. London: Frederick Muller Ltd. 1937. Pp. 88. 3*s*. 6*d*.

discusses the subject clearly and concisely, and his little book is particularly suitable for intelligent adult patients.

ENCEPHALITIS IN JAPAN

THERE was an epidemic of encephalitis in Japan in 1873 and another in 1911. The latter was looked on as a cerebro-spinal meningitis, and it was not until the epidemic of 1924, in which over 6000 cases were reported, that the true nature of the 1911 outbreak was realised. In 1929 there was a smaller outbreak, with nearly 2000 cases, and the disease was prevalent again in 1935 (5000 cases). Apparently it is more or less endemic in Japan, at any rate in the summer months, especially in certain seaside places. In 1933 a committee was appointed to investigate it, and as head of this committee Inada is now reviewing its work in a French journal.[1] Real progress as regards the ætiology of the disease dates, he says, only from 1933, when Hayashi succeeded in transmitting it to Java monkeys. In the same year besides transmitting encephalitis to monkeys Webster and Fite in the United States succeeded in infecting mice. This opened up wide possibilities, which the committee fully used in the 1935 epidemic. They find that up to the seventh day of disease inoculations of brain matter will usually infect mice. It has also been possible to infect them with blood, either directly inoculated or transmitted through mosquitoes. Cerebro-spinal fluid was most infective for mice during the second to fifth days of disease. It was noted that virulence sometimes increased after the third or fourth passage through the mouse. Monkeys, it now appears, are less susceptible than mice, and their susceptibility varies with species and age. The incubation period when human material is directly inoculated into the monkey appears to be about 5–8 days. As regards mode of infection, Inada considers two hypotheses—infection through the nasal mucosa and infection by the bite of an infected mosquito. In weighing these it must not be forgotten that the Japanese epidemic and the St. Louis epidemic—with both of which these observations deal—differed in several ways from the great European epidemics of 1917–26. In particular, the difference in the season at which they occurred has a bearing on the mode of spread. The outbreaks in the European (lethargic) epidemics were almost limited to the colder months; their recurrent peaks were in the second half of the winter; the Japanese and St. Louis outbreaks, on the other hand, were in the summer. The idea that the disease is transmitted through the nose is based on the fact that typical changes have been found in the brain after direct nasal infection of animals, and the finding of the virus in nasal washings; the difficulty of accepting it is the rarity of multiple cases of infection in one household. All the Japanese workers agree that in animals infection by the nose is more often successful than subcutaneous or intraperitoneal injection, and indeed is only second to direct cerebral inoculation. Twenty-four hours after nasal injection into the mouse the virus can be obtained from the olfactory lobe and transmitted with it to another animal. Infection by mosquito bites have been unsuccessfully attempted in the United States, but has been achieved in Japan with difficulty and after repeated passages. It seems evident that certain forms of mosquito can harbour the virus, but further observations are necessary before one can decide how far this fact affects mankind.

[1] Inada, R. (1937) *Pr. méd.* **45**, 99 and 386.

CHOLINE DERIVATIVES

NOT long ago [1] we referred to the modern tendency to search among substances chemically related to powerful drugs and hormones in the hope of discovering compounds in which a single activity of the parent substance is prominently exhibited, and by way of example we cited the action of carbaminoylcholine on the bladder in certain cases of retention of urine. A valuable account of the effect of this drug on 26 normal persons has since been given by Prof. Starr [2] of Philadelphia, and includes a record of his own experience after taking a large dose. A similar investigation by Myerson, Loman, and Dameshek [3] of Boston has been made for acetyl-beta-methylcholine (Mecholyl), and a comparison of the effects of the two substances is interesting. They are both parasympathomimetic, acting on the circulatory system, the alimentary tract, bladder, and skin. The effect of mecholyl is prompt, marked, and transient, and includes flushing of the face and chest, perspiration, salivation, rhinorrhœa, lacrymation, fall of blood pressure, and an increased pulse-rate which the authors are at a loss to explain. Carbaminoylcholine (Doryl) is slower but more prolonged in its action which is otherwise similar in many respects to that of mecholyl. Prominent among the symptoms to which it gives rise are, however, increased peristalsis and colic, and although flushing and sweating are conspicuous, the effects on pulse and blood pressure are slight. With both drugs atropine annuls unpleasant effects, though animal experiments show that carbaminoylcholine has a stronger "nicotine action" than mecholyl and the consequent stimulation of autonomic ganglia must persist even after atropine. The action of mecholyl on the alimentary tract is slight, but more work is necessary before it can be assumed with confidence that this is the drug of choice for circulatory effects and carbaminoylcholine for visceral activity. The length of time for which the substances act introduces a complicating factor. Thus Kramer [4] of Philadelphia reports good results in peripheral vascular diseases using mecholyl, but finds difficulty with thrombo-angiitis obliterans. Starr, on the other hand, records two cases of thrombo-angiitis obliterans which benefited greatly from carbaminoylcholine, the reason being, apparently, the more prolonged action of this drug. The American investigators seem primarily interested in the relief of peripheral vascular lesions, and their results are on the whole encouraging. They point out the danger of treating patients with a tendency to asthma with choline derivatives, and although atropine is effective in preventing disastrous effects, such patients are not likely to benefit from the more desirable peripheral actions of the drugs.

Summer Time will commence in Great Britain, Ireland, the Channel Islands, and the Isle of Man on Sunday morning next, April 18th, at 2 A.M., when the hands of timepieces should be advanced one hour. It will end on Sunday, Oct. 3rd. Summer time began in France on Saturday, April 3rd, at 11 P.M., and will end there at midnight on Saturday, Oct. 2nd.

[1] *Lancet*, Jan. 30th, 1937, p. 276.
[2] Starr, I., *Amer. J. med. Sci.* March, 1937, p. 393.
[3] Myerson, A., Loman, J., and Dameshek, W., *Ibid*, February, 1937, p. 198.
[4] Kramer, D. W., *Ibid*, March, 1937, p. 405.

PRINCIPLES OF MEDICAL STATISTICS

XVI—CALCULATION OF THE STANDARD DEVIATION *

IN Table III, which appeared in the article on the variability of observations and is here reprinted, there are given twenty observations of systolic blood pressure of which the mean value was found to be 128. The variability of these observations was measured by means of the standard deviation.

TABLE III

(*Reprinted from* THE LANCET, *Jan. 23rd, 1937, p. 219*)

Twenty observations of systolic blood pressure.	Deviation of each observation from the mean (mean = 128).	Square of each deviation from the mean.
(1)	(2)	(3)
98	−30	900
160	+32	1024
136	+ 8	64
128	0	0
130	+ 2	4
114	−14	196
123	− 5	25
134	+ 6	36
128	0	0
107	−21	441
123	− 5	25
125	− 3	9
129	+ 1	1
132	+ 4	16
154	+26	676
115	−13	169
126	− 2	4
132	+ 4	16
136	+ 8	64
130	+ 2	4
Sum 2560	0	3674

This value was calculated by (1) finding by how much each observation differed from the mean, (2) squaring each of those differences, (3) adding up these squares, and finding their mean by dividing by the number of observations, (4) taking the square root of this number. Putting this in symbols, if the number of observations is n, each observation is designated by x, and the mean of them by $\bar{x}$, then the standard deviation equals

$$\sqrt{\frac{\text{Sum of values of } (x-\bar{x})^2}{n}}.$$

This method of calculation would have been much more laborious if the mean blood pressure had not been a whole number—e.g., if it had been 128·4—and if each of the original observations had been taken to one decimal place—e.g., the first had been 98·7. The differences between the observations and their mean, and the squares of these values, would then have been less simple to calculate. But in such cases the necessary arithmetic can still be kept simple by a slight change of method.

The Ungrouped Series

Instead of measuring the differences between the observations and their mean we can first take those differences from some other point, *any* point which makes the calculation simpler, and make a correction at the end for having done so. For instance, taking the figures of Table III, instead of calculating the differences between the observations and their mean value, 128, let us measure the differences between the observations and 100. These differences are given in column (2) of Table III A and their squares in column (3). The sum of the squared deviations from 100 is 19,354 and the mean squared difference is, therefore, 19,354 ÷ 20 = 967·7. To this value we must now make a correction for having measured the deviations from 100 instead of from the mean of 128. The correction is to subtract from this mean square value of 967·7, the square of the distance between the value from which we chose to measure the deviations (100 in this case) and the value from which we ought to have measured them (128). Thus we have 967·7 minus $(128-100)^2$, or $(28)^2$,= 967·7 minus 784, which gives 183·7. The standard deviation is, then, $\sqrt{183{\cdot}7} = 13{\cdot}55$, the value we reached before by taking the deviations from the mean itself.

TABLE III A

Calculation of Standard Deviation : Ungrouped Series

Twenty observations of systolic blood pressure.	Deviation of each observation from 100.	(Deviation.)²	Square of observation.
(1)	(2)	(3)	(4)
98	− 2	4	9,604
160	+60	3,600	25,600
136	+36	1,296	18,496
128	+28	784	16,384
130	+30	900	16,900
114	+14	196	12,996
123	+23	529	15,129
134	+34	1,156	17,956
128	+28	784	16,384
107	+ 7	49	11,449
123	+23	529	15,129
125	+25	625	15,625
129	+29	841	16,641
132	+32	1,024	17,424
154	+54	2,916	23,716
115	+15	225	13,225
126	+26	676	15,876
132	+32	1,024	17,424
136	+36	1,296	18,496
130	+30	900	16,900
Sum 2560	—	19,354	331,354

If the observations all lie near one hundred this is a convenient method of working, for the deviations are thus reduced to a size which it is easy to handle and the squares can often be done in one's head. On the other hand one has to make subtractions from 100 to obtain the deviations. Even this step can be eliminated by measuring the deviations of the observations from zero—i.e., by squaring the observations themselves, as is done in column (4). The squares can be taken from a book of tables (e.g., Barlow's Tables of Squares, Cubes, Square Roots, &c. London: E. and F. Spon. 1930. 7*s.* 6*d.*)

This obviates finding any deviations at all.

The sum of these squares is 331,354, and the mean square is 331,354 ÷ 20 = 16,567·7. In using the squares of the observations themselves we have measured their deviations from 0 instead of from the mean value of 128. Therefore the distance between the value from which we chose to measure the deviations and the value from which we ought to have measured them is 128; as correction we must, then, subtract $(128)^2$ from our mean square value. This gives 16,567·7 minus 16,384 = 183·7, and the standard deviation is $\sqrt{183{\cdot}7} = 13{\cdot}55$ as before. To calculate the standard deviation in a short ungrouped series of figures the procedure is, then, as follows: (1) find the mean of the observations; (2) square each

* In accordance with many requests, I am adding to this series, of which the main argument was concluded in THE LANCET of last week, two additional articles on the calculation of (1) the standard deviation, and (2) the correlation coefficient. The latter will appear next week.

observation; (3) sum these squares and find their mean; (4) from this mean square subtract the square of the mean; (5) the square root of this last value is the standard deviation.

The standard deviation therefore equals :—

$$\sqrt{\frac{\text{sum of squares of observations}}{\text{number of observations}} \text{ minus } (\text{mean of observations})^2}$$

or in symbols is $\sqrt{\frac{\text{sum of } (x)^2}{n} - (\bar{x})^2}$.

(The proof of the correction is quite simple but the worker who wishes to apply the method has no need to worry about it.)

The Grouped Series

With a large number of observations this method of squaring each observation would be very laborious. A shorter method which will give very nearly the same result can be adopted. The observations must first be grouped in a frequency distribution. As an example we may take the distribution given in Table II (see *Lancet*, Jan. 23rd, p. 219) of the ages at death from diseases of the Fallopian tube. This distribution is given again in column (2) of Table III B.

TABLE III B

Calculation of Standard Deviation: Grouped Series

Age in years.	Number of deaths in each age-group.	Age in working units.	(2) × (3).	(3) × (4).
(1)	(2)	(3)	(4)	(5)
0–	1	−6	− 6	36
5–	—	−5	—	—
10–	1	−4	− 4	16
15–	7	−3	−21	63
20–	12	−2	−24	48
25–	35	−1	−35	35
30–	42	0	—	—
35–	33	+1	+33	33
40–	24	+2	+48	96
45–	27	+3	+81	243
50–	10	+4	+40	160
55–	6	+5	+30	150
60–	5	+6	+30	180
65–	1	+7	+ 7	49
70–75	2	+8	+16	128
Total ..	206	—	+195	1237

To reach the mean age at death we could add up the 206 individually recorded ages and divide by 206. But at the risk of making only an immaterial error we can shorten this process by presuming that the individuals belonging to each 5-yearly age-group died at the centre age of that group—e.g., that the 42 women dying at ages between 30 and 35 all died at age 32·5. Some will have died between 30 and 32·5, some, perhaps, at exactly 32·5, some between 32·5 and 35. If the distribution is fairly symmetrical, then the positive and negative errors we make by this assumption will nearly balance out. The sum of the 206 ages at death will then be $(2{\cdot}5 \times 1) + (12{\cdot}5 \times 1) + (17{\cdot}5 \times 7) + (22{\cdot}5 \times 12) + \ldots\ldots + (62{\cdot}5 \times 5) + (67{\cdot}5 \times 1) + (72{\cdot}5 \times 2) = 7670{\cdot}0$ and the mean age at death is $7670{\cdot}0 \div 206 = 37{\cdot}2$ years. Having found the mean in this way the standard deviation could be found by calculating how much the observations in each group deviate from it and taking the square of this value. For instance the 12 individuals in the age-group 20–25 died on our assumption at age 22·5. They differ from the mean, therefore, by 14·7 (37·2 minus 22·5), the square of which is 216·09, and this value we must take 12 times as there are 12 individuals with that deviation.

Following this procedure we should reach for the squares of the deviations of the individuals from their mean the following values :—

$$(-34{\cdot}7)^2 \times 1 + (-24{\cdot}7)^2 \times 1 + (-19{\cdot}7)^2 \times 7 + (-14{\cdot}7)^2 \times 12 + (-9{\cdot}7)^2 \times 35 + (-4{\cdot}7)^2 \times 42 + (0{\cdot}3)^2 \times 33 + (5{\cdot}3)^2 \times 24 + (10{\cdot}3)^2 \times 27 + (15{\cdot}3)^2 \times 10 + (20{\cdot}3)^2 \times 6 + (25{\cdot}3)^2 \times 5 + (30{\cdot}3)^2 \times 1 + (35{\cdot}3)^2 \times 2 = 26{,}310{\cdot}54.$$

The standard deviation is, therefore,

$$\sqrt{26{,}310{\cdot}54/206} = \sqrt{127{\cdot}72} = 11{\cdot}30.$$

SHORT METHOD, WITH GROUPED SERIES

This is a possible method of working but, it will be observed, a somewhat laborious way. In practice a much shorter method is adopted. The principle of this method is that instead of working in the real, and cumbersome, units of measurement we translate them arbitrarily into smaller and more convenient units, work the sums in those smaller units, and translate the results back again into the real units at the end.

Let us, for instance, replace 32·5 by 0, 27·5 by −1, 22·5 by −2, and so on, 37·5 by +1, 42·5 by +2, and so on. (The original groups must be of equal size; they were all 5-yearly in our example.) Now instead of having to multiply 27·5 by 35, for example, we have the simpler task of multiplying −1 by 35. These multiplications are made in column (4) of Table III B. Their sum, taking the sign into account (as must be done), is +195. The mean in these units is, therefore,

$$+195/206 = +0{\cdot}947.$$

The standard deviation can be found in these same small units, measuring the deviations of the observations from the 0 value instead of from the mean for simplicity. The squares of the deviations in these units are merely 1, 4, 9, 16, &c., and these have to be multiplied by the number of individuals with the particular deviation—e.g., 7 × 9 for the −3 group, 24 × 4 for the +2 group, and so forth. A simpler process still of reaching the same result is to multiply column (4) by column (3), (instead of multiplying 7 by 9 we multiply (7 × −3) by −3). This gives the figures of column (5). The sum of these squared deviations is, then, 1237 and their mean is $1237/206 = 6{\cdot}0049$.

These deviations in working units have been measured round the 0 value, whereas they ought to have been measured round the mean (in working units) of + 0·947. The correction, as stated before, is to subtract the square of the distance between the value round which the deviations ought to have been measured and the value round which they were in fact measured; in this case the distance is $0 - 0{\cdot}947 = -0{\cdot}947$. The standard deviation in working units is therefore $\sqrt{6{\cdot}0049 - (-0{\cdot}947)^2} = 2{\cdot}26$.

We have now to translate the mean, +0·947, and the standard deviation, 2·26, back into the real units. This is simply done. The mean in working units is +0·947—i.e., 0·947 working units above our 0. In real units our 0 is equivalent to 32·5, for that is the substitution we made (note, the *centre* of the group against which we placed the 0, not its beginning, a mistake which is somewhat easy to make). The real mean must therefore be $32{\cdot}5 + 5\ (0{\cdot}947) = 37{\cdot}2$—which is the same as the value we found by the long method using real units throughout.

The multiplier 5 is arrived at thus: the mean is found to be 0·947 above the 0 value when the groups differ in their distances from one another's centres by unity—e.g., from −1 to −2; but in the real distribution their distance from one another's centres is 5—e.g., from 27·5 to 22·5; therefore the mean in real units must be 5 times 0·947 above 32·5 (if the mean in working units had been

+1 clearly the real mean would be 37·5, for the latter is the value for which +1 was the substitute—i.e., 32·5 + 5 (1)).

The *rule* then is this. Having found the mean in working units, multiply its value by the original unit of grouping (4, 5, 10, or whatever it may be) and add the resulting figure (or subtract it according to its sign) to the value of the *centre* of the group against which the 0 was originally placed. That gives the real mean value. To reach the real standard deviation all that has to be done is to multiply the standard deviation as found in working units by the original units of grouping—in this case by 5. For if this measure of the scatter of the observations is 2·26 when the range is only 14 units (from −6 to +8) it must be 5 times as much when the range is really 70 units (from 2·5 to 72·5). The real standard deviation is therefore 5 × 2·26 = 11·30.

CHECKING THE ARITHMETIC

As regards the final result it is immaterial where the 0 is placed; the same answers in *real* units must be reached. From the point of view of the arithmetic it is best to place it centrally so that the multipliers may be kept small. For the sake of demonstration the calculations for Table III B are repeated in Table III C taking another position for 0. This, in practice, is a good method of checking the arithmetic.

TABLE III C

Calculation of Standard Deviation: Grouped Series

Age in years.	Number of deaths in each age-group.	Age in working units.	(2) × (3).	(4) × (3).
(1)	(2)	(3)	(4)	(5)
0–	1	−8	− 8	64
5–	—	−7	—	—
10–	1	−6	− 6	36
15–	7	−5	− 35	175
20–	12	−4	− 48	192
25–	35	−3	−105	315
30–	42	−2	− 84	168
35–	33	−1	− 33	33
40–	24	0	—	—
45–	27	+1	+ 27	27
50–	10	+2	+ 20	40
55–	6	+3	+ 18	54
60–	5	+4	+ 20	80
65–	1	+5	+ 5	25
70–75	2	+6	+ 12	72
Total ..	206	—	−217	1281

From the calculations in Table III C we have:

Mean in working units = −217/206 = −1·053

∴ mean in real units = 42·5 −5 (1·053) = 37·2 (42·5 is the centre of the group against which the 0 was placed; note that the correction has now to be subtracted for the sign of the mean in working units is negative).

Mean squared deviation in working units round 0 = 1281/206 = 6·2184

∴ standard deviation in working units is

$$\sqrt{6{\cdot}2184 - (1{\cdot}053)^2} = 2{\cdot}26$$

(1·053 is the distance between the value of 0 from which we measured the deviations and the value from which we ought to have measured them; note that the correction is *subtracted* whatever the sign of the mean in working units).

∴ the real standard deviation is 2·26 × 5 = 11·30. These values agree with those previously found.

The Standard Deviation in Small Samples

Finally it may be noted that the standard deviation found for a set of observations is an estimate of the variability of the observations in the population, or universe, that has been sampled. A slightly better estimate is reached by dividing the sum of the squared deviations *from the mean* by $n-1$ instead of by n (where n is the number of observations). If the number of observations is large the difference is immaterial; if it is small some difference results. A simple method of making this change is to calculate the standard deviation in the way just described and multiply the result by $\sqrt{\frac{n}{n-1}}$ e.g., the standard deviation of the 20 observations of blood pressure in Table III would be $13{\cdot}55 \times \sqrt{\frac{20}{19}} = 13{\cdot}90$. This correction should be applied if the number of observations is less than about 30, especially if tests of "significance" are to be applied.

A. B. H.

THE FIGHT AGAINST LEPROSY

THE fourfold objective of the British Empire Leprosy Relief Association was outlined by Dr. Ernest Muir, its medical secretary, at the annual meeting held at the India Office on April 15th. The Association is concerned with the study of leprosy and of the conditions under which it exists and spreads. It endeavours also to help the leper, by care, treatment, and training; to combating leprosy with a view to its final control; and to interest, rouse, and educate the British public in the problem of leprosy. Dr. Muir said that since the inception of the Association 13 years ago a much more accurate idea had been obtained of the widespread distribution of leprosy and of the various factors which govern its incidence. Study of the disease itself had shown that while most lepers are not infectious, a few highly infectious cases can spread the disease to many others, and thus one generation infects the next. Those infected in childhood furnish most of the serious infectious cases. As to treatment, it was now recognised that though medicines are of value, the main remedy lies in healthy occupation and sound nutrition. Compulsory segregation and treatment were generally worse than useless. The leper must be led, not driven; without his coöperation neither effective treatment nor limitation of the infection could be secured. Segregation by itself would never do more than touch the fringe of leprosy control—at least in poor and densely populated countries; but well-equipped and staffed settlements could be used as centres for an educative campaign, and indeed their chief function should be to act as a centre of training and enlightenment in the district.

The annual report of the Association emphasises the fact that leprosy is a problem of colonial development. At present two types of leper institution are to be found; one is a refuge where patients crippled and deformed and often non-infective are concentrated, while infectious cases, not recognised as such, mix freely with the community. The other progressive type is that to which cheerful and energetic lepers are attracted mainly by the hope of recovery. It is to the organisation and multiplication of this latter type of settlement that the Association is devoting its energies and as well as to the education of all people in the nature of leprosy and the means of its prevention. Sir William Peel has succeeded Sir Edward Gait as chairman of the executive committee of the Association. He made an urgent plea for more support from the British public for the maintenance and extension of its activities.

SPECIAL ARTICLES

TREND OF THE POPULATION OF ENGLAND AND WALES DURING THE NEXT HUNDRED YEARS

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For some time before the late war—in fact after the year 1870—and to a greater extent since, there has been in this country a steady drop in the fertility-rate coupled with a gradual lowering of the death-rate. As a result of these two movements the population of England and Wales is rapidly ageing. To ascertain the effect of this tendency on the future age-distribution of the population I have assumed in these notes that for the next hundred years the fertility-rate remains at the 1933 level, and that the mortality-rates are as obtaining in 1931. The 1931 census population being taken as basis, successive male and female populations at the various ages were estimated for each future census by means of the 1931 life table, assuming the 1933 fertility-rates by age-groups of all women (15–45) to persist and the ratio of male to female births to be 1·050.

The results are set out below. Table I gives the estimated population by age and sex at each future census up to and including the year 2031, expressed as a percentage of the corresponding population at the 1931 census; while Table II shows the percentage age-distribution of the male and female populations at each future census for the next hundred years. The various changes in age-distribution of the total population and in the magnitude of each age-group can be conveniently analysed for each sex in the following categories: infants (0–5), children of school ages (5–15), young adult and early middle-age workers (15–45), middle-age workers (45–65), and pensioners (65+).

Table I

Estimated population by age-groups at each census date during the next hundred years expressed as a percentage of the corresponding age-group population in 1931

MALES

Age	1931	1941	1951	1961	1971	1981	1991	2001	2011	2021	2031
0–5	100	90	85	75	68	62	56	50	46	42	38
5–15	100	85	79	74	65	59	54	48	44	40	36
15–45	100	105	100+	91	82	75	68	62	56	51	46
45–65	100	105	115	128	129	115	103	96	86	77	71
65+	100	127	145	151	170	186	184	162	147	136	122
All ages	100	102–	102–	99	94	87	80	72	65	59	54
FEMALES											
0– 5	100	90	84	75	67	61	55	50	47	41	37
5–15	100	85	79	73	65	58	54	48	43	40	36
15–45	100	100–	92	82	74	68	61	55	50	45	41
45–65	100	111	120	126	121	105	94	67	79	70	64
65+	100	126	152	168	182	190	180	158	142	130	117
All ages	100	101+	101–	97	91	84	76	65	63	57	51

(1) *Infants* (0–5).—This group comprised 8 per cent. of the whole population as regards males and 7 per cent. as regards females in 1931. In the year 2031 these percentages will each have dropped to 5. Also by this time the number of males of this group will have steadily fallen to 38 per cent. of their number in 1931 while the females will be reduced to 37 per cent.

(2) *School-children* (5–15).—In 2031 the males of this group will comprise 12 per cent. of the total male population and the females 11 per cent. of the female population as compared with 17 per cent. and 16 per cent. respectively in 1931. Again the males and females of this group will, as in the group above, steadily decrease in numbers during the period; in the year 2031 each will be only 36 per cent. of the 1931 population of this group.

(3) *Young adults and early middle-aged* (15–45).—In 1931 this group formed 47 per cent. of the total population for each sex; in the year 2031, however, the males will be reduced to 40 per cent. and the females to 38 per cent. Moreover, the males will by then have fallen to 46 per cent. and the females to 41 per cent. of their numbers respectively in 1931.

(4) *The middle-aged* (45–65).—The percentage of total population formed by this group will increase during the next hundred years from 21 to 28 for males and from 22 to 28 for females. In the year 2031, however, the males will be reduced to 71 per cent. and the females to 64 per cent. of their numbers respectively in 1931, the census maximum of 129 per cent. for males being reached about 1971 and that of 126 per cent. for females in 1961, some ten years earlier.

Table II

Percentage age-distribution of male and female populations at each census during the next hundred years

Census	Age ..	0–5	5–15	15–45	45–65	65+	All ages
1931	M	8	17	47	21	7	100
	F	7	16	47	22	8	100
1941	M	7	14	49	22	8	100
	F	6	13	47	24	10	100
1951	M	7	13	46	24	10	100
	F	6	12	44	26	12	100
1961	M	6	13	43	28	10	100
	F	5	12	40	29	14	100
1971	M	6	12	41	29	12	100
	F	5	11	39	29	16	100
1981	M	6	12	40	28	14	100
	F	5	11	38	28	18	100
1991	M	6	12	40	27	15	100
	F	5	11	38	27	19	100
2001	M	5	12	40	28	15	100
	F	5	12	40	23	20	100
2011	M	5	12	40	28	15	100
	F	5	11	38	28	18	100
2021	M	5	12	40	28	15	100
	F	5	11	38	27	19	100
2031	M	5	12	40	28	15	100
	F	5	11	38	28	18	100

(5) *Pensioners* (65+).—Male pensioners will increase from 7 per cent. to 15 per cent. of the total male population during the next hundred years, while the females will increase from 8 per cent. to 18 per cent. The numbers of both sexes will also rise rapidly until the year 1981, when the males will be 186 per cent. and the females 190 per cent. of their respective numbers in 1931. By the year 2031, however, these percentages will have dropped to 122 and 117 respectively.

The maximum total population, 19,600,000 males and 21,200,000 females, will be attained about the year 1944, and at the end of a hundred years the total population will be only about half of that in 1931—namely, 10,280,000 males and 10,680,000 females approximately.

* The opinions and conclusions expressed herein are my own and the London County Council accepts no responsibility for them.

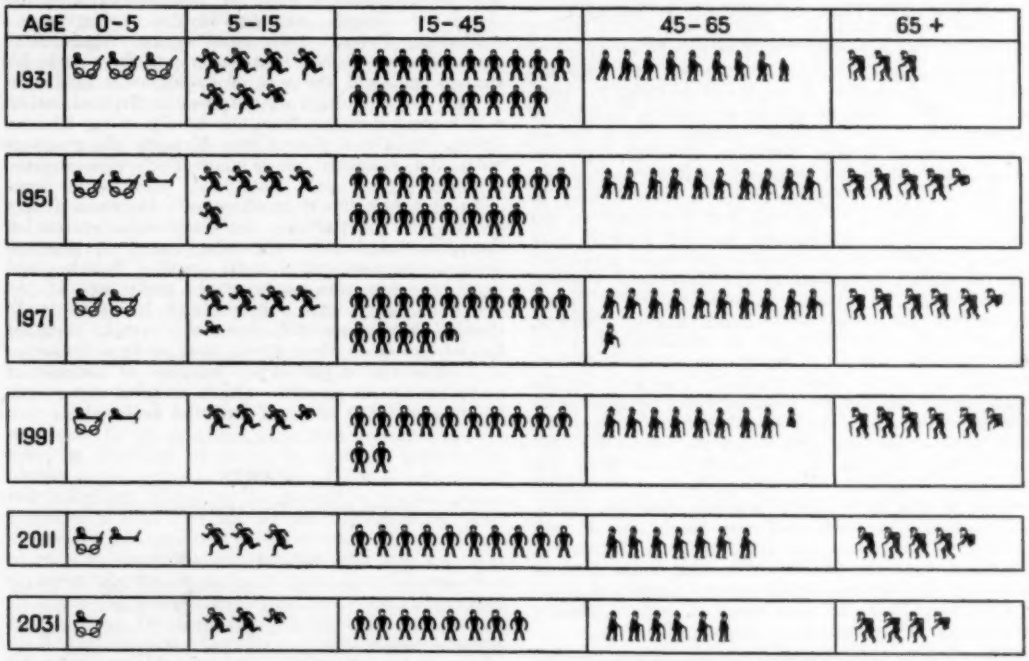


Diagram showing the population of England and Wales at twenty-year intervals during the next century. The calculations are based on the assumption that the fertility-rate is the same as in 1933 and the mortality-rate the same as in 1931. Each homuncule represents one million persons.

The effect of these changes in the number and age-distribution of the population will be far-reaching. The reduction in the number of females of the child-bearing ages (15–45) will mean fewer babies and eventually fewer school-children; this in turn may lead to fewer schools and teachers in the years to come. Moreover, any further lowering of the fertility-rate, coupled with a drop in the number of potential mothers and fathers, would cause a still further reduction in the number of births.

As the older generations die off the fall in the number of young adults of both sexes will cause a dearth of employees and potential purchasers of food and commodities. Trade will consequently suffer; on the other hand wages will tend to increase. Another serious aspect is the financial effect of an increasing pensioner group (age 65+) coupled with a decreasing contributor group (aged 15–65) on annuity and pension funds. One thing is certain—namely, that, in future, the annual pension will be much greater; for example, at the end of the period it will be more than twice the cost in 1931.

The flow of population to the large towns has gradually drained the countryside of its workers, and the steady decrease in population in the future will accentuate this depopulation of the rural districts more than ever. Unless a determined move is soon made to repopulate country districts, our supply of home-grown food, already inadequate to feed the nation, will tend to disappear. It may also be asked how we are going to maintain our fighting forces with a regular supply of recruits and man our merchant service with seamen in the future, in view of the certainty of a steady fall in the number of young male adults. These problems will force themselves on the attention of our politicians before many years are past; one of them—that of defence—is already causing anxiety.

In this investigation the possible effects of migration have been ignored, since it is obviously impossible to attempt to forecast the extent of emigration that may take place from this country in the coming years. There will doubtless be determined efforts in the near future to increase the outward flow of population to various parts of the Empire, especially of young adults and children; this, of course, will add to the increasing high proportion of persons over 45. It is unlikely that fertility-rates will fall much lower—there are already signs of a slight upward tendency—and it is doubtful whether there will be a much further reduction in the general death-rate in view of the steady increase in the percentage of total population in the older age-groups amongst which the majority of deaths occur. Should, however, an improvement in fertility take place in the future, this will be largely counteracted for some years to come by the increase in the death-rate. We can therefore assume that apart from the effects of future migration the above estimates give a reasonably accurate forecast of the trend of the population of England and Wales during the next century, unless significant changes in fertility- and mortality-rates occur during the period.

CHELMSFORD NEW HEALTH CENTRE.—The mayor of Chelmsford has opened a new public health department where clinics will be held and the staff of the borough medical officer housed. There is a health visitors' room, a treatment department in which minor ailments are dealt with, a dark-room, a consulting-room, a dental department, and a recovery room. The cost has been £8000.

MANCHESTER MEDICAL LIBRARY

THE question of increased accommodation for the storage of books and of improved facilities for their easy use is a problem almost as pressing to medical schools as is that of more laboratory and lecture room accommodation. Manchester University is recognising this in its present appeal for money and in its plans for the future. Its medical library to which, in addition to its own staff and students, the members of the Manchester Medical Society have access, and which is to a considerable degree supported by the latter, is housed in the university medical school. But the present accommodation is by no means all that could be desired; Harvey Cushing, himself an eminent authority on medical books, has described the library as one of the best he had seen but as one of the worst housed. The acids of the Manchester atmosphere, some of them perhaps from the university's own chemical laboratories, assisted by the fumes of the gas with which the rooms were for many years lighted, have played havoc with the bindings. Space too is deficient, both for qualified readers and for the students who are using the library in increasing numbers and who would use it still more if elbow-room and comfort were improved. The fact that the students' reading room acts as a passage for access to the general room and committee room tells its own tale. A lecture theatre is also urgently required.

The library, which claims to be the largest medical library in England outside London, contains some 75,000 bound volumes as well as many thousands of pamphlets which are only now in process of being sorted and catalogued. One of the avowed objects of the Manchester Medical Society when it was founded in 1834 was "to establish a medical library and reading room." For many years its progress, at first in a private house in Faulkner-street, then in the Royal Institution (which is now the City Art Gallery) was slow. In 1875 an arrangement was arrived at by which Owens College housed the books in its newly built medical school at the back of the Oxford-road buildings, and provided the medical society with headquarters. The college gave a grant to help in maintenance and as this grant was augmented it obtained increasing rights for its staff and students. As the library grew the society found it more and more difficult to maintain its standard of efficiency, until in 1930 it was handed over to the university, the members of the society retaining their right to the use of the books and accommodation. As the gift implied that the society could not now break away taking the books with it, it became worth while for the university to develop the library and to spend money in housing it properly. The university has allotted a site for it conveniently close to the medical school.

The library, as it stands, is largely the result of the work of Dr. Thomas Windsor (1831–1910), a bibliophile of bibliophiles. Valuable collections have been given, one by Dr. Samuel Crompton, another by Dr. Charles Clay of ovariotomy fame, others by the Royal Infirmary and the Manchester St. Mary's Hospitals. Many rare books are to be found on the shelves. Among the incunabula are an Italian copy of "Guy de Chauliac" (1480). Other early books are a "Herbal or Boke of the Properties of Herbes" (1548), of which no other example is known, and a copy of Wolveridge's "Speculum Matricis or The Expert Midwives Handmaid" (1671) which is very rare. The library possesses also a presentation copy of Beaumont's work on Alexis St. Martin, and two copies of Parkinson's "Shaking Palsy," both rare works. Apart from books there is John Hunter's grandfather clock, his dinner bell, and the seal of his diploma as Fellow of the Royal College of Surgeons in Ireland, all of which were acquired from the family of Sir Richard Owen, to whom they came through his marriage with the daughter of William Cliff who assisted Hunter.

In part owing to want of space in the main library rooms, and in part for convenience, a system of departmental libraries—physiology, anatomy, pharmacology, gynæcology, cancer, public health, and dentistry—has been inaugurated; these hold all the books on their own subjects and facilitate study though they create difficulties of control. Another special section is given up to local medical history—of Manchester in particular, but also of Lancashire and Cheshire in general—which contains some 1100 volumes and 230 boxes of unbound material.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE HAWKING OF DRUGS

LAST year a new law regulating the sale of drugs came into force in France. This law was the inevitable reaction to the self-prescribed pharmacological orgies in which the country has indulged with ever-growing zest. The law strikes at the sale of drugs outside the chemist's shop which, if the chemist himself is on duty, is supposed to serve, if not as an absolutely fool-proof safety valve, at least as a check on the public's ardently misguided search for health in a bottle. The new law also attempts to put a spoke into the wheel of the circularising "herborist" who, through the post and persuasive touts, offers Nature's cures without discrimination. A recent number of the *Siècle Médical* reports an important judgment of the *tribunal correctionnel* of Nancy. In this town a certain doctor of pharmacy was prosecuted for the sale of drugs under conditions infringing the law of Sept. 4th, 1936. On the first occasion he was acquitted by the tribunal which found that he had acted in good faith. Regarding this judgment as an incentive he employed nine motor lorries on regular circuits of neighbouring villages, collecting orders and distributing goods already ordered. These lorries were in effect chemists' shops on wheels without a duly qualified chemist to put on the brake. The leniency shown by the tribunal on the first occasion was not repeated, and the chemist was fined 300 francs and ordered to pay 10,000 francs damages to the Syndicat des pharmaciens de Lorraine. The judgment in this test case should prove an obstacle to the sale and delivery of pharmacological preparations at the customer's door as though they were the daily necessities of life.

THE FUTURE OF NURSING IN THE AIR

Dr. P. Béhague, who is "vice-président délégué" of the Comité Central d'Aviation Sanitaire, and who has done much to organise a network of first-aid posts on the French main roads, is not a little concerned about the future of nursing in the air. During the past two years more than 200 French nurses have passed all the tests required of them for air ambulance service, and now they find there is little scope for their activities in this sphere. From a national

point of view, their sacrifices in time and money and energy have certainly not been wasted, for these enterprising young women have set an excellent example to their brothers and other members of the "sexe faible." The authorities are not to be blamed unreservedly for having encouraged young nurses to qualify for duties of a hypothetical character, and it was made plain enough from the outset that the emergencies in which air nurses might be called to serve might never materialise. But the fact remains that these nurses have found no immediate return for a relatively costly investment. Dr. Béhague is inclined to think that there has been a certain fundamental misconception about first aid in the air. As he points out, both peace-time and war-time emergencies may make calls on air ambulance space so great that it will often be given to two patients rather than to one patient plus a nurse. If nursing is required in a particularly important case, this can be given by a doctor. His advice to would-be first-aid workers in the air is, in effect, that they first learn to fly, and that they then master whatever may be required of them as first-aid attendants. Merely to qualify as an air nurse and not as a pilot is to risk being left behind on the ground in an emergency. Experience with first aid on the highways has convinced Dr. Béhague that the most satisfactory arrangement is to teach the men in charge of first-aid posts on the roads the elements of first-aid which can thus be given far more promptly than were the injured to be cared for by skilled first-aid workers rushed up from some distant centre. And in this connexion he compares the man on a highway present at the time of an accident with the pilot who has learnt not only to fly but also to nurse.

It is probable that the majority of Dr. Béhague's 200 nurses have followed a course of a few hours in first aid, or at most have completed a nursing course of only a few months; and the guess may be ventured that few possess the official nursing diploma. It is not surprising, therefore, that these 200 have been unable to find employment in a country where the State regulates the training of nurses and has created a State diploma.

COMPULSORY ANTI-TYPHOID AND ANTI-DIPHTHERIA VACCINATION FOR MEDICAL STUDENTS

It will be remembered that last summer the attention of the French Academy of Medicine was drawn to the high diphtheria-rate among medical students and the need for protecting them against it by artificial immunisation. Dr. Clément's advocacy of this measure was supported by no less an authority than Dr. Rouvillois, who went one better by advocating triple associated vaccination of medical students against typhoid, diphtheria, and tetanus. The commission created by the Academy was remarkably strong and representative, and its rapporteur was Prof. Tanon. When it met in February of this year it decided that compulsory vaccination against tetanus might be dispensed with considering how rare this disease is in medical students. On the other hand, it was agreed that associated vaccination against typhoid and diphtheria should be recommended as a compulsory measure early in the medical curriculum and without recourse to the Schick test. The Academy of Medicine has now adopted the findings of its commission, and the next step will presumably be their presentation to the Ministers of Public Health and National Education.

NOTIFICATIONS OF THE CAUSES OF DEATH

The inability or unwillingness of many doctors to state in writing why some of their patients died has for many years been a thorn in the flesh of the public health authorities. In 1927 there were as many as 70,000 deaths whose cause was not accurately specified in the death certificates. In 1933 this figure rose to 113,000, or 17 per cent. of all the deaths recorded in this year. Since Jan. 1st, 1929, a more or less concerted effort has been made by five departments or counties to reform matters in this respect, and the departmental inspectors of hygiene have coöperated with medical practitioners so effectively that the proportion of deaths from unknown causes has been reduced to less than 5 per cent. The principles on which this reform has been based are now to be introduced in all the other departments in France as from July 1st, 1937. In the past, vagueness in the wording of death certificates has often reflected a doctor's sense of obligation to professional secrecy; and it is to ease his conscience in this respect that in the future death certificates will be so drafted that the part showing the cause of death will be detached from the part on which the name of the dead person is inscribed. There will also be such a speeding up of the passage of the death certificate to its final destination that if it is faultily worded it can promptly be referred back to its author.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A REVIEW OF THE YEAR

THE introduction of the estimate for the Department of Local Government and Public Health by the Minister gave an opportunity in the Dáil last week for a general discussion of questions of public health. The total grant asked for was £1,259,068, which included a sum of £769,432 for housing and £327,005 for social services. The Minister stated that the administration of public health was now supervised in every county by a county medical officer of health. Throughout the country the organisation of public health measures was being gradually perfected, and further improvements in the public health might be hoped for. The vital statistics for 1935—the latest available—showed a slight rise in both birth-rate and death-rate. The former had increased from 19·49 per 1000 in 1934 to 19·61 in 1935, and the latter from 13·15 to 13·98. The increase in the death-rate was largelv due to a high incidence of the principal infectious diseases, which were more numerous than in 1934, being 1865 as compared with 1359. Three cases of typhus fever were recorded, the lowest number in the history of the country. The incidence of diphtheria had diminished, the decrease being greatest in those areas where the most intensive immunising campaigns had been carried out. There had been heavy mortality from measles during the year, the number of deaths being 316, whereas they were 50 in the previous year. Infant mortality shared in the general increase of the death-rate, being 68 per 1000 births as compared with 63 in the previous year. The greater mortality among infants was chiefly due to congenital defects and to outbreaks of diarrhœa and enteritis. The Minister hoped that the carrying into effect of the regulations made in pursuance of the Milk and Dairies Act, 1935, would go a long way to reduce the incidence of those diseases. The infant mortality was highest in the urban areas; in Waterford it was 126 per 1000 births, in Kilkenny 110, in Limerick 106, and in Wexford 103. The rate in Dublin had risen from 80 in 1934 to 94 in 1935. Valuable work for the safeguarding of

infant life was being carried out under approved maternity and child welfare schemes in many of the urban areas and in a few counties. Approved schemes for the supply of free milk to poor children had been in operation in all areas except two urban districts in which the local authorities declined to avail themselves of the amounts of money allocated. School medical inspection was now carried out in every county, and was associated with medical and surgical treatment for certain defects. School meals were now supplied by 51 local authorities, the number of meals supplied in 1936 being approximately 4,231,872.

There was an increase in the number of deaths from tuberculosis from 3520 to 3770, the death-rate being much higher in the urban than in the rural areas. There had been a grant from the Hospitals Sweepstakes Fund of £10,000 toward medical research, and a council to administer the Fund had been appointed. A sum of £10,000 had also been allocated for the establishment of a hospital library service. The Minister dealt at length with what had been done in regard to housing. The total number of houses built since 1932 would appear to be 14,895 in urban areas and 8662 in rural areas.

SITUATION OF THE HOSPITALS

In the subsequent discussion the Minister was questioned as to his intentions in regard to the development of the hospital system of the country, and specially with reference to the Dublin hospitals. Dr. Rowlette (Dublin University) drew attention to the report of the Hospitals Commission which had been in the Minister's hands for some 18 months. The report had recommended a certain line of development of the Dublin voluntary hospitals but the Minister's decision had not yet been given. The hospitals concerned were at a standstill through not knowing what their future was to be. At the same time the pressure on their bed-accommodation was steadily increasing. Not only was the population of Dublin growing rapidly but the desire and need for hospital treatment in preference to home treatment were also growing, and would continue to grow. He emphasised that the Sweepstakes were organised by those interested in the voluntary hospitals for the aid of the voluntary hospitals, and the voluntary hospitals had a primary claim on the Sweepstakes Funds.

This contention was admitted in his reply by the Minister. He agreed that the voluntary hospitals "had, ethically and in all justice, a right to primary consideration when distributing the Hospitals Sweepstakes Funds." He declared also that it was not his intention to spend on the hospitals of local authorities more than one-third of the net amount received out of the Hospitals Sweepstakes Funds for hospitals.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. D. R. F. Bertram to *St. Angelo* for R.N. Hospital, Malta.

Surg. Lts. C. J. Robarts to *Halcyon* and F. Bush to *Pembroke* for R.N.B.

Surg. Lt. (D) D. D. Craig to *Wildfire*.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Capt. L. S. Ashcroft to *President*.

Surg. Lt.-Comdrs. E. F. St. J. Lyburn to *Resolution*; S. B. Borthwick, F. E. Stabler, T. C. Larkworthy to *President*; and C. Seeley to *Royal Sovereign*.

Surg. Lts. G. L. Foss to *President* and D. R. Maitland (proby.) to *Victory*, for R.N. Hospital, Haslar.

ARMY MEDICAL SERVICES

The War Office announces that Brevet-Col. R. C. Priest, Hon. Physician to the King, has been selected for appointment as Professor of Tropical Medicine, Royal Army Medical College, and Consulting Physician to the Army, with effect from June 6th, 1937, in succession to Col. J. Heatly-Spencer, Hon. Physician to the King, who is retiring.

ARMY DENTAL CORPS

Lt. T. A. Smitham to be Capt.

ROYAL ARMY MEDICAL CORPS

TERRITORIAL ARMY

Col. A. P. Watson, O.B.E., T.D., having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Lt. T. W. Preston to be Capt.

J. L. Murray (late Offr. Cadet, Durham Univ. Contgt. (Med. Unit), Sen. Div., O.T.C.) to be Lt.

A. D. Kelly (late Cadet C.S.M., Durham Sch. Contgt., Jun. Div., O.T.C.) to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. H. W. A. Post from Active List to be Capt.

ROYAL AIR FORCE

Wing Comdr. H. S. C. Starkey, O.B.E., to No. 3 Flying Training School, Grantham, for duty as Medical Officer.

Squadron Leader P. D. Barling to R.A.F. Station, Feltwell, for duty as Medical Officer.

Flight Lt. G. H. J. Williams to Home Aircraft Depôt, Henlow.

Flying Offrs. N. P. R. Clyde to R.A.F. Station, Waddington, and D. F. Shaw to R.A.F. Station, Harwell.

Dental Branch.—Flight Lt. W. D. Guyler to R.A.F. Station, Seletar, Straits Settlements.

INDIAN MEDICAL SERVICE

Maj.-Gen. Sir C. A. Sprawson, Kt., C.I.E., K.H.P., retires.

Brevet-Col. A. A. C. McNeill has been appointed as Deputy-Director of Medical Services at Army H.Q., New Delhi, in place of Maj.-General F. D. G. Howell, D.S.O., M.C., K.H.S., transferred to Aldershot as D.D.M.S. in March last.

Majs. to be Lt.-Cols.: S. L. Patney, D. N. Bhaduri, B. Basu, O.B.E., M. A. Jafarey, G. Verghese, and A. D. Loganadan.

Col. W. H. Hamilton, C.I.E., C.B.E., D.S.O., K.H.P., to be Maj.-Gen.

Lt.-Col. A. F. Babonau, C.I.E., O.B.E., to be Col.

Lt.-Col. T. L. Bomford retires.

Capt. K. Cunningham resigns his commn.

Indian Medical Department.—Asst. Surgns. (1st Cl.) to be Lts. (Sen. Asst. Surgns.): W. G. Sherard and S. G. Jackson. Lt. (Sen. Asst. Surg.) A. E. Gomez, M.B.E., retires.

COLONIAL MEDICAL SERVICE

Dr. B. S. Jones and Dr. G. E. McVitie have been appointed Medical Officers, West Africa, and Miss M. J. Lyon, M.B., B.S., Medical Officer, Malaya. Sir Robert G. Archibald, C.M.G., D.S.O., M.D., has been appointed Medical Superintendent, Chacachacare Leper Settlement, Trinidad. Dr. G. E. Craig becomes Deputy-Director of Medical Service, Gold Coast, Mr. R. M. Dannatt, Resident Surgeon, Colonial Hospital, Grenada, and Dr. L. G. W. Urich (Medical Superintendent, Chacachacare Leper Settlement) Medical Officer of Health, Trinidad.

DEATHS IN THE SERVICES

The death occurred at Southsea on April 11th of Surgeon Captain HUGH PRIDEAUX TURNBULL. Born at Plymouth in June, 1873, he was son of the late Alexander Turnbull, M.D., of the Naval Medical Service. He was educated at St. Paul's School (1884–90) and St. George's Hospital, London, qualifying M.R.C.S. Eng. in 1897. He at once entered the Navy, was appointed surgeon of the sloop *Torch* (101 men), and landed in Samoa in 1899 for service with the Naval Brigade, and was mentioned in dispatches. He became surgeon commander in May, 1913. He served in the European war on H.M.S. *Roxburgh* (1914–16), and then was put in charge of the Royal Naval Hospital, Bermuda (1916–19). In 1922 he was squadron medical officer in the battleship *Barham*, and he subsequently held the post of professor at H.M. Navigation School, Portsmouth.

PUBLIC HEALTH

MILK EXAMINATION

A COMPARISON OF THE PLATE COUNT AND REDUCTASE TEST

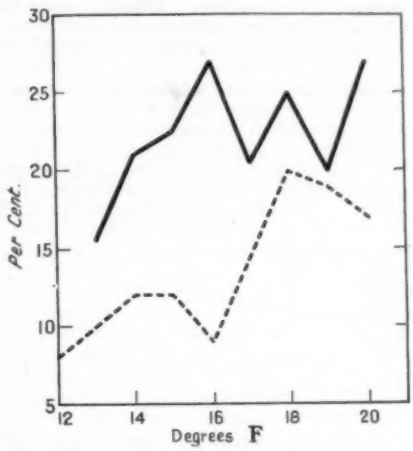
BY J. STEVEN FAULDS, M.D.

PATHOLOGIST TO THE CUMBERLAND INFIRMARY, CARLISLE

DURING the past year several papers have been published comparing the methylene-blue reductase test with plate count and *B. coli* estimation. Opinions differ about their merit, but it is agreed that the results of the plate count are not consistent. The most obvious reasons for the inconsistency are the difficulty of obtaining an accurate representative sample of a fluid difficult to shake efficiently, the difference of temperatures, and the agitation of samples during transit, which quickly changes their bacterial content.

To ascertain how far the results of the methylene-blue reductase test and the plate count are in agreement I have examined 1500 samples by both of them (end of March to end of November, 1936). For the reductase test the technique described by Prof. G. S. Wilson (1935) was observed, particularly regarding methylene-blue (Dr. Orla Jensen, Stockholm), water-bath temperature and half-hourly inspection. The plate count was carried out according to the Ministry of Health Memorandum (1923), the media being simple Lab. Lemco and not a milk-enriched variety. Plates were made from dilutions 1/10 and 1/100 in 15 cm. plates and 1/1000 and 1/10,000 in 11 cm. plates and a count made of each plate unless the total number of colonies made the counting an impossibility. If any plate showed a substantial discrepancy it was discarded; otherwise the total count was struck from an average of the most countable plates. *B. coli* was estimated by taking 1 ml. of 1/10, 1/100, and 1/1000 dilution in standard McConkey fluid medium. Two technicians did all the plating-out and periodically the accuracy was checked by duplicating a sample of milk, when the figures obtained were always approximately the same.

In comparing results of the reductase test with the count and *coli*, I found that there were 22·3 per cent. of samples which passed one test but not the other. The inconsistency was greatest in June and July when we had warmer weather, and it evidently depended upon the temperature of the milk on arrival. A total of 5·3 per cent. passed the reductase test but failed by the count and *coli* estimation (accepting the "tuberculin-tested" standard, 1936, of 200,000 per ml. and *coli*-negative in 1/100 ml.) and of these 79 milks, 80 per cent. failed owing to there being *coli* present in 1/100 ml. The remaining 17 per cent. passed the count and *coli* standard and yet failed by the methylene-blue reductase test. The reductase test, was, therefore, not stringent enough in 5 per cent. of milks and too severe in 17 per cent. I then tabulated all those samples which failed by the reductase test and which had not more than 100,000 organisms per ml. and were *coli*-negative in 1/100 ml. according to the time at which the colour was discharged. There was no apparent correlation. Evidently the time of reduction by the reductase test did not always depend on the total number of organisms. When, however, all the milk specimens were grouped according to the temperature on arrival and a graph drawn of the discrepancies at each temperature, a curve was produced which, while irregular, showed that there was a higher percentage of discrepancies at higher temperatures (see Figure). When the discrepancies were subdivided into those that passed the count and *coli* standard and failed



Graph showing the percentage of discrepancies at various temperatures. Continuous line = total discrepancies. Interrupted line = count and *coli* pass, reductase test fail.

by the methylene-blue reductase test a similar curve was obtained. At a temperature around 13°–15° C. there was only 15 per cent. of difference between the two results. When the temperature of the milk on arrival was 20° C. there was a total difference of 27 per cent.

DISCUSSION

The cause of the reduction of the methylene-blue is obscure, but with aerobic cultures and correctly performed the test is alleged to be an index of bacterial metabolism. Different organisms have different reducing powers and it has been found that *Streptococcus lactis* reduces even more rapidly than *B. coli*, given an equal amount of equivalent suspensions, and that strains of hæmolytic streptococci vary considerably in their reducing-time. Some are as active as *coli* while others do not reduce within the six hours. On the whole, however, we can accept the fact that a milk incubated aerobically that reduces methylene-blue does so because of bacterial growth, though the converse does not hold as Malcolm and Leitch (1936) have proved.

When it comes to comparing the plate counts with the reductase test difficulties arise, especially when the results of different laboratories are compared. Wilson (1935) states that the experimental error in plate counts is high and that any given count may be either half or double that shown. I tried to check this observation, but never managed to obtain a difference of anything like this figure. The error arises more in the dilutions than in the readings of the plates and this observation supports the work of Mattick and others (1935) who found that two observers using exactly the same technique and examining the same milk at the same time got results as close as did one observer plating a milk out in duplicate. On the other hand, the results obtained by different workers using the same technique on identical samples of milk

in different laboratories were by no means the same, because of the different conditions the milk was subjected to before being tested. Though Wilson does not regard the tests as strictly comparable, it is reasonable to expect that different laboratories submitting samples of milk to *both* tests will obtain similar results; but even this does not happen. The accompanying Table compares the results of four independent analyses. Malcolm and Leitch (1936) found 45 per cent. of discrepancies, Tudor and Thomas (1936) 22 per cent., and I have found 22 per cent.; Nichols and Edwards (1936) found that of milks with counts between 30,000 and 200,000, 24 per cent. reduced methylene-blue while of milks with a count of over 200,000 22 per cent. failed to do so, but when these were classified into readings above and below 200,000 the error was reduced to 10 per cent. These observers did not include the presence of *B. coli* in 1/100 ml. nor did they adhere to the standard time the milks were to be kept, according to the memorandum, differentiating morning from evening samples. The time the methylene-blue was read was 5 and 6 hours, not 4½ and 5½ as stipulated. The figures of Malcolm and Leitch show much higher plate counts than I obtained, but that could be accounted for by the enriched medium used.

Table showing results of comparisons between reductase and plate-count tests

—	Number of samples.	Per cent. failed by reductase and passed by plate count and *coli*.	Per cent. failed by count and *coli* and passed by reductase.	Total discrepancies per cent.
Malcolm and Leitch	7248	11	34	45
Thomas and Tudor	400	9	13	22
Nichols and Edwards	1000	24*	22*	10
Faulds	1500	17	5	22

* No *coli* estimation.

The plea that the reductase test is better than the older method must be based on its being either simpler to perform or more accurate. The accuracy I doubt, for to quote Breed (1936), New York State agricultural bacteriologist, "the mere fact that duplicate results of the reductase test are generally uniform does not, of course, prove anything regarding the accuracy of the results." The advantage must be in simplicity. The reductase test is much easier to perform and saves time and material; it can be carried out by semi-skilled labour unless we include the coliform test. By including this, which I feel is necessary for accuracy, the dilutions entail time, material, and skill; and the end-result is a test requiring the same skill, time, and material as the old plate count and coliform test.

The argument of economy is doubtful. The average charge for the plate count and coliform test was 3*s*. 6*d*. and the suggested charge for the reductase test alone 1*s*., or, when the coliform test is added, 1*s*. 6*d*. The cost of the material is less than 1*d*., but the overhead charges and arrangements for collecting samples and supplying outfits justifies this charge. The laboratory charges however are only a fraction of the cost of sampling. In some areas the council employs a whole-time sampling officer who has to take morning and evening samples of milk. In other areas, as in Cumberland where the area of milk production is large, the sampling is done by the local councils through their sanitary inspectors and a grant is made by the county council to the inspectors for every sample taken. In the case of rural samples this grant is 5*s*., but in urban samples it is 1*s*. In Westmorland, the sum is a flat rate of 2*s*. 6*d*. per sample. Now a reduction of 3*s*. 6*d*. to 1*s*. will be no economy if the Ministry's recommendation of sampling each milk twelve times a year be carried out, for the cost will rise in proportion.

CONCLUSIONS

The methylene-blue reductase test is much simpler to apply than the plate count and it yields 75 per cent. of comparable results. On the whole it is a more stringent test in warm weather and less stringent in cold weather—the opposite of what is needed. The arguments in favour of its adoption as an economy are weak if the cost of the collection is taken into account. If the coliform test has to be performed in addition, the advantage of the reductase test over the plate count and coliform test is not so great as would appear.

I wish to acknowledge with thanks the help and stimulus I have received from Mr. R. Simpson, F.R.C.V.S., county veterinary officer for Cumberland.

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INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 3RD, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1661; diphtheria, 926; enteric fever, 16; pneumonia (primary or influenzal), 1337; puerperal fever, 27; puerperal pyrexia, 110; cerebro-spinal fever, 24; acute poliomyelitis, 4; acute polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 9; ophthalmia neonatorum, 108. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 9th was 3314 which included: Scarlet fever, 856; diphtheria, 961; measles, 45; whooping-cough, 530; puerperal fever, 16 mothers (plus 11 babies); encephalitis lethargica, 283; poliomyelitis, 1. At St. Margaret's Hospital there were 18 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 123 great towns,* including London, there was no death from small-pox, 2 (0) from enteric fever, 23 (0) from measles, 5 (1) from scarlet fever, 31 (8) from whooping-cough, 26 (4) from diphtheria, 47 (14) from diarrhœa and enteritis under two years, and 101 (17) from influenza. The figures in parentheses are those for London itself.

Barking and Cardiff each had 1 death from enteric fever. Six deaths from measles were reported from Birmingham, 3 from Walsall. Fatal cases of whooping-cough were scattered over 21 great towns: Brighton reported 3. Fatal diphtheria was reported from 20 great towns: Liverpool had 3 deaths.

The number of stillbirths notified during the week was 274 (corresponding to a rate of 43 per 1000 total births), including 38 in London.

* Twickenham with a population of 86,600 became a great town on April 1st as the result of a change of boundary.

PANEL AND CONTRACT PRACTICE

Panel Practitioner Fined for Non-attendance

A DOCTOR has been fined £5 by the Middlesex insurance committee for breach of the medical service regulations. There was evidence that she was called at 6.40 P.M. on Dec. 19th to visit a young woman who was a panel patient. She did not come and was sent for again at 10 P.M. Again she did not come but left a prescription on the window-sill and gave the parents a bottle of medicine and some oil to rub on the patient's chest. She excused herself on the plea that she was tired after a very busy day. The father tried to obtain another doctor's services in vain. Next morning the doctor called at 10.30, diagnosed bronchitis, asked for the prescription which had been left on the window-sill, altered it, and said she would send a nurse. At 12.30 P.M. she came again, in answer to a fresh summons, sent for an ambulance and had the patient removed to hospital. At the hospital the parents were told that it was too late to do anything more; the patient died at midnight of the same day from pneumonia. The amount of the fine may perhaps be deemed to indicate that the most serious view was not taken of the practitioner's default. While the insurance committee evidently could not overlook what had occurred, those who know the strain under which practitioners work at times when ill health is specially prevalent may be ready to appreciate that moments may come when the doctor is genuinely "too tired to attend."

Dispensing in Scotland

Some statistics relating to the Scottish drug bill were recently analysed by the superintendent of the Central Checking Bureau in Scotland. It appears that during 1936 some four and a quarter million prescription forms were received from many sources: (1) 54 insurance committees in Scotland; (2) the government of Northern Ireland; (3) various local authorities; (4) the Ministry of Pensions; (5) public medical services. Only the first two categories include National Health Insurance prescriptions. The receipts of Scottish panel chemists have risen by 79 per cent. in the 20 years from 1915 to 1935 and by another 9 per cent. in 1936. The average price per form had increased from 9·74*d.* in 1915 to 13·32*d.* in 1935 and 13·60*d.* in 1936. These figures did not include the cost for insulin. In 1935 the cost per person in Scotland for drugs and prescribed appliances ranged from 17·17*d.* to 52·76*d.*, with an average of 23·17*d.* In England the cost ranged from 23·1*d.* to 52·8*d.*, with an average of 36*d.* Frequency in Scotland ranged from 1·10 to 2·93, with an average of 1·73 as compared with 2·69 to 6·76 and 4·60 in England. The average price per prescription form ranged from 11·21*d.* to 17·99*d.*, with a general average of 13·32*d.* The comparable English figures were 7·1*d.*, 10·1*d.*, and 7·38*d.*

Some insured persons were the recipients of expensive prescriptions, for example: six prescriptions for amino-acetic acid, cost in all £20 10*s.* 6*d.*; one insured person still under treatment received during eleven years 1083 lb. of an ointment, which cost £138; one insured person in a period of three years received insulin, liver extract, and mixtures at a total cost of £235.

Prescribing in Lancashire

The Lancashire panel committee has been examining the report issued by the insurance committee in April, 1936, on the cost of drugs and medicines prescribed for insured persons in the county. The cost of supplying drugs to the insured population has increased steadily during the last twelve years not only in Lancashire but in all parts of the Kingdom; the committee are anxious to help to prevent further increases and indeed to bring about a reduction in cost if this can be done without reducing therapeutic efficiency. In Lancashire frequency has increased from 3·87 in 1923 to 5·05 in 1935, but the committee point out that this latter figure is only 0·2 higher than in London and is 1·40 lower than in Manchester. The increase corresponds to that for visits or consultations all over the country. The Insurance Acts Committee showed that in 1923 each insured person was seen, on an average, 3·75 times and in 1935 the figure had risen to 5·11. The increase in frequency is attributed entirely to the altered habit of the insured population and to the increased amount of work done by the doctors; recent health propaganda has caused the insured person to become "health conscious" and even "disease conscious." He takes more notice of slight ailments and consults his doctor earlier and more frequently. Gradually the insured population is becoming composed of persons who never at any time have paid private fees for medical attendance, whereas the original insured population had already acquired an economic habit in this respect. It is likely, therefore, that the frequency factor has not yet reached the peak and will not do so until the entire insured population consists of persons who have never received medical attendance in any other way. The panel committee express the opinion that the frequency factor is almost entirely outside the control of the doctors.

With regard to the total cost per prescription, the dispensing fee is a fixed cost, practically constant, and is also entirely outside the control of the doctor. The ingredient cost however was 3·79*d.* in 1935. A number of prescriptions are for specially expensive products—e.g., about 100 autogenous vaccines (two guineas each) are prescribed every year and about 150 stock vaccines at half a guinea. A few months ago the attention of the Lancashire panel committee was called, though not by way of complaint, to a prescription for Felton's serum, costing over £7. One doctor ordered in seven days for one patient oxygen costing £75. Many prescriptions are for expensive products for intramuscular or intravenous injection, and other special prescriptions cost four to five shillings. If the cost of expensive but perfectly justifiable prescriptions were separated before the average for the ordinary prescription was taken, the ingredient cost of a 10 oz. bottle of medicine would probably be somewhere about 2·5*d.* The use of proprietary products does not seem to have been an important factor in the increased cost of prescribing, but the committee believe that some slight economy might be effected by the avoidance, when possible, of the use of such remedies. In their opinion the occasions on which the ordering of proprietary products can be justified are comparatively few.

The committee observe that in May last the Minister of Health stated in reply to a question in the House of Commons that he had received a report from the Lancashire insurance committee to the effect that there was unnecessary prescribing by doctors in Lancashire. So far as the panel committee were aware, the insurance committee had expressed no such opinion.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A TADDYGADDY

III

"The wisdom of a learned man cometh by opportunity of leisure; and he that hath little business shall become wise."

THAT, oddly enough, was written also by Ben-Sira, and in the very same chapter as that into which we have dipped already. It seems untrue at first; but when we go on reading we find out what he really was getting at. He was thinking of leisure from bodily toil. He had few illusions concerning that. "Send him to labour that he be not idle; for idleness teacheth much mischief," he wrote of the slave. Apparently there were people in his neighbourhood, men in advance of their time, who were trying to set up some sort of Labour Party. Ben-Sira did not at all approve. "How," he asks, "can he get wisdom that holdeth the plough, and that glorieth in the goad, that driveth oxen, and is occupied in their labours, and whose talk is of bullocks?" So every carpenter and workmaster that laboureth night and day. . . . They shall not sit in the judges' seat, nor understand the sentence of judgment: they cannot declare justice and judgment; and they shall not be found where parables are spoken."

* * *

That is not quite in accord with modern ideas, though there are plenty only too ready to agree. How does the suggestion affect us? Few of us in active practice have much leisure, yet some of us do become wise in spite of our considerable business. Indeed it is due largely to our press of work that we acquire wisdom, or at any rate a useful store of common sense. That, I have felt for many years, is not used as freely as it should be. There is so much more we doctors might do, so much we have to offer, in the public service. Some of us serve on town councils, some as magistrates; but relatively few of us do that. The plea put forward for not doing it is that we have no time to spare. Is that wholly true? My experience is that there is always time for what one really wants to do. I say that advisedly. I have been a town councillor, I am a magistrate, and I have never in my life been leisured. The years during which I was a town councillor were extremely busy ones, but there was always time for a meeting. Only very seldom were the meetings barren of interest. I found my brethren, especially the more aged of the aldermen, fascinating to study, and I made a collection of mayoral impressions that is quite beyond all price. That a doctor should be interested in the doings of a health committee is obvious. What is not so obvious is the undoubted fact that as a member of a health committee he has opportunities for studying the underlying causes of all manner of public activities, and—even more illuminating—inactivities. If he has cultivated a sense of humour—and he will not be a real doctor if he has not done that—he will find in his work on a town council infinite reason for laughter; and if he can succeed in making the lay brethren laugh with him he will have done more than justify his retention of his seat.

* * *

On the bench his opportunities are even greater. Knowledge of men and women, understanding of the infinite twists and turns of human behaviour, are needed in the courts more, perhaps, than anywhere else. Why, the man on the bench must be asking all the time, did that fellow in the dock behave as apparently he did? Why? That must be the keynote all through. And—I say this advisedly, and with a due sense of responsibility—that keynote seems very often to be muffled. The fact of some act contrary to public order is established: the reason for that act is not. That is where we come in, or should come in. Our training and our experience have caused us to look, almost instinctively, for causes. We know that without some understanding of the cause no problem of our professional life can be fully solved: that treatment under such a condition can be no more than empirical. So is it with the problems of the courts. And that is of the very first importance when we are dealing with the problems of the juvenile courts. Children do the oddest things which get them into trouble with the police. Why? It should be our job to find out if we can. It is not easy. Often it is extremely difficult. However, if our good fortune gives us a seat in a juvenile court we shall have plenty of opportunities for trying. Those courts, as established now, provide facilities, freed from all red tape fetters, for making any investigation that may seem advisable.

* * *

Our training and experience should render us peculiarly fitted for work in the courts. We know the people of our district better, perhaps, than anybody else. We are familiar with the language called by the police "obscene." It is really no more than ugly and lacking originality: the coarse back chat of a rough fellow stirred by (not infrequently alcoholic) emotion. It is not easy to persuade our lay brethren of the bench to appreciate that. We know how easily back-street tempers get stirred by the basic fact that back-street people see too much of one another, living as they do almost in one another's pockets. We understand the bitterness lying dormant, and often not so very dormant, in a yard common to three or four little houses. We know something of the back-street pride that is so very easily wounded. All these are features that bring people to the defendant's pen in what is called, quite improperly, the police-court. If we will, and if our luck has given us a seat on the bench, we may do much in the way of interpreting behaviour that seems, at the first glance, very odd.

* * *

"They shall not understand the sentence of judgment. . ."

Ben-Sira wrote that a very long time ago, and he did not mean by it quite what it may seem to mean to-day. But it is as true to-day as when he wrote it. "They" very often do not understand. How should they? The sentence so often is quite incomprehensible to the sentenced. A fine of a couple of pounds, to be levied from a man whose income already is inadequate, means that he and his family will have to go short of vital necessaries. A sentence of fourteen days' imprisonment, with the consequent "sack," means—what does it mean? We, whose working life has taken us in and out of little houses, visualise at once the problems raised by action in the courts. If we have the will we become vocal

about them. That does not make us popular in our immediate circle, but . . . should we play for that sort of popularity?

* * *

In practice, a doctor who takes part in public life is likely to find it all rather difficult. He knows too much. That is a very decided handicap—in the eyes of other people. On the health committee he will be in immediate conflict with those who own, or are friends of those who own, insanitary property. On the bench he will be in conflict with those who have an itch for punishing, and no desire whatsoever for understanding. He is not unlikely to find his path very thorny indeed. But if he be dogged—and what real Taddygaddy is not dogged?—he will win. For there are those who will heed if only he express himself with sufficient force.

Why is it that so few of us, relatively, take part in public life? I think it is because we are, like miners, content to be a class apart. Miners shelter in ugly dwellings remote from other people. We shelter behind brass plates and surgery lamps. While actually as sociable as any other men, in our working time we assume a sort of esoteric aloofness and, most unfortunately, many of us carry our working habits into our play time. I suppose we are, in a way, shy. Also there is this undoubted fact to be faced—a doctor must not take sides on any subject too fervently if he is to make good at his main job. His day-to-day work brings him into contact with all sorts, and he does not wish to offend any. That is reasonable; but it does in practice mean that a great deal of potentially valuable public activity is allowed to run to waste.

CORRESPONDENCE

ANÆMIA AND THE PITUITARY

To the Editor of THE LANCET

SIR,—We have read the annotation on p. 877 of your last issue with considerable interest, but we should like to point out that it does not give a very clear view of the position. This is, we suggest, as follows:—

(1) We published in 1934[1,2] a series of papers describing the appearance of a gastric lesion in the rabbit and other animals following the injection of posterior-lobe extracts. This has been confirmed by a large number of workers.[3-6]

(2) We have also shown that small doses of pituitary extract will inhibit gastric secretion.[7]

(3) We showed that the injection of posterior-lobe extract into the rabbit will cause in about 20 per cent. of the animals a very severe macrocytic anæmia, and since this was associated with reticulocytosis and with excessive production of bile, we were led to make the following comment: "The interpretation of these results is at present obscure. The possibility arises that the control of blood destruction by the reticulo-endothelial system may be vested outside the system itself and may reside in the posterior lobe of the pituitary gland."[8]

(4) Gilman and Goodman, in a series of papers,[9-11] have repeated these observations and have fully confirmed the fact that the injection of posterior-lobe extract into rabbits will produce an anæmia of exactly the same type as that described by us. They, however, advance a different explanation from the very tentative suggestion put forward by ourselves. We shall in the near future produce further evidence on this point.

(5) The paper referred to by your annotator, by McFarlane and McPhail,[12] again confirms our findings, using guinea-pigs. These workers demonstrate the development of anæmia in guinea-pigs following the injection of posterior-lobe extracts. They killed their animals at a date so long after the injection that the stomach lesion that would have been present would undoubtedly have been healed. It is interesting to note also that these workers found that the anæmia did not come on in the guinea-pig until so late a date after the injection as to render the explanation advanced by Gilman and Goodman extremely unlikely.

Our object in writing this letter is to point out that in all these papers there is no question of the validity of the fundamental observation that a severe anæmia may be produced by the injection of pituitary extracts.

We are, Sir, yours faithfully,

E. C. DODDS,
R. L. NOBLE.

Courtauld Institute of Biochemistry, The Middlesex Hospital, London, W.1, April 13th.

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THE TAVISTOCK CLINIC

To the Editor of THE LANCET

SIR,—The council of the Institute of Medical Psychology have decided, after much deliberation, to change its title and revert to the original name of "The Tavistock Clinic." I should like through your columns to notify the profession of this fact so that no confusion may arise in their minds.

The Tavistock Clinic was the original name adopted when in 1920 the work of providing psychological treatment was begun in a house in Tavistock-square. As the clinic grew, its name became well known amongst the profession at home and also on the Continent and in the United States. A good many people seem hardly to have realised that it was changed some four or five years ago, and to them there will seem nothing unusual in our new title.

The change has seemed advisable largely because of the constant confusion which arose as a result of the non-medical institutes of psychology and psychotherapy which have arisen during the past few years. Some of these have gone so far as to copy our literature and our stationery, evidently feeling that this was likely to be of value to them. Any hospital is reluctant to change its name because there is inevitably some loss of goodwill, particularly amongst those who support or might support the work. I am confident, however, that we can rely upon our many friends in the profession to see that such loss does not occur, and that whatever good reputation the Institute of Medical Psychology had shall be

carried over to the Tavistock Clinic which certainly needs all the help that they can give it.

I am, Sir, yours faithfully,

HENRY B. BRACKENBURY,
Chairman of the Council.

The Tavistock Clinic, Malet-place, London, W.C.1, April 12th.

MEDICAL EDUCATION OF WOMEN

To the Editor of THE LANCET

SIR,—Medical women will have welcomed the sympathetic letter from the regius professor of physic at Cambridge in the *Daily Telegraph* of March 25th, in which he supports a plea made by a group of Cambridge women students for more educational facilities in London. I doubt, however, whether his suggestion that the big London schools should admit women, and thereby win the applause of the multitude by a "generous gesture," will tempt them to act against their feelings and possibly their judgment. Medical education is a practical issue, and its development depends on expediency as well as lawfulness. I remember that four London schools admitted women during the war when fees were scanty, and excluded them again when male students became more numerous.

I do not think it is necessary, or desirable, to hammer at unwilling London hospitals, and the Cambridge students little know what they are in for if they should obtain concessions by that means. Women are probably better off even in a second-rate school without prejudice, than in a first-rate school where they are unwelcome.

The opposition of the London hospitals is not altogether without reason. It is said, for instance, that the success of the medical schools depends to some extent upon athletic prestige, and we are assured that athletes hate to be educated with women. It is hardly to be expected that the authorities should forego a clientele they want, for a clientele they don't want. There is another objection, one which may have a wider appeal. In the choice of students a medical school is guided by the return it is likely to get from them—either intellectual or commercial. Compared with men, there is said to be a greater risk of a woman failing to finish the course and still more risk of her failing to practise her profession. The survey of the fate of women medical students educated at St. Mary's between 1916 and 1924 (*Lancet*, 1936, **2**, 1370) is of interest in this connexion. Popular medical schools may consider it wasteful to take this chance when they can avoid it. The commercial return from women is also likely to be less valuable because their practices are not usually so lucrative either to themselves or to the consultants.

All this need not unduly depress us. The time will surely come when St. Bartholomew's, St. Thomas's, and Guy's (I quote the hospitals mentioned by Prof. Ryle) will realise that a superior woman may be worth more to them than an inferior man, and in this connexion, also, the report mentioned above is illuminating. Meanwhile the larger non-teaching hospitals, such as the West London and the Royal Northern, might find it a positive advantage to take women as students. Neither is London the only centre of learning; there must be nearly a dozen other universities which provide good medical education. Oxford and Cambridge strike one as being obviously suited to provide the clinical work for Oxford and Cambridge women; they have large modern hospitals, fully staffed and equipped, and numerous professors and research departments.

It should be understood that no plan for extending medical education is going to be the slightest use to women unless it includes giving them resident hospital appointments. Openings in hospitals are a far more pressing need than openings in medical schools, and it is misleading, to say the least of it, if a medical school offers equality of education when the hospital connected with it excludes women from competing for the resident posts after graduation.

I am, Sir, yours faithfully,

NORAH H. SCHUSTER.

Upper Harley-street, N.W., April 7th.

ERGOTAMINE TARTRATE IN MIGRAINE

To the Editor of THE LANCET

SIR,—I can confirm the experience of your correspondents on the value of ergotamine tartrate in the treatment of migraine. I have been subject to attacks of migraine for 63 years. During the last 40 years I have tried every diet and tested every drug that anyone could suggest. I have seen every consultant in London of whom I heard as having a special knowledge of migraine and have had various injections but all without avail. Twelve months ago I began using ergotamine tartrate in the form of Femergin tablets and it is the first remedy with any prophylactic effect which I have taken. In my case it has been more the severity than the frequency of the attacks which it has influenced. I have been taking two tablets every night now for over a year without any ill effect except that for a couple of weeks at first there was a daily attack of slight intestinal colic for about two hours. When I began the treatment I was spending a day in bed every ten days but the interval at once lengthened to three months. The intervals of freedom from headache lengthened to about fifteen days. The fasting during the continuance of the pain must of course continue. No doubt with injections the relief would have been still more marked. I am, Sir, yours faithfully,

Jersey, C.I., April 9th. J. H. CROWLEY.

PRECIPITATE LABOUR

To the Editor of THE LANCET

SIR,—Some of your readers may be interested in the following case:—

A European primipara aged 28, healthy except for a mild degree of glycosuria controlled without insulin by ten lines of R. D. Lawrence's diet, went into labour at full term on the night of July 29th, 1936, at 11.10 P.M. The pains were slight and only amounted to abdominal discomfort but, merely as a precaution, she called the nurse at 11.30 P.M. At 11.40 she had the first real pain and this was followed by another which ruptured the membranes and produced the infant at 11.45 P.M., much to the dismay of the nurse who had naturally not anticipated such rapid developments and had made no attempt to control the passage of the head over the perineum. The placenta followed the infant within three minutes and examination of the patient on my arrival at midnight revealed a complete tear of the perineum and from 1¼ to 2 in. of the rectum. The infant weighed 6½ lb. and the whole duration of labour from the first premonitory signs until the delivery of the placenta was less than 40 minutes.

Immediate suture of the torn perineum and rectum resulted in an uneventful convalescence.

The two questions suggested by this case are, first, whether the glycosuria had any connexion with the precipitate labour and, secondly, why nature in such a case did not provide for the preservation of at least the rectal sphincters.

I am, Sir, yours faithfully,

Digboi, Assam, March 18th. W. B. CRAWFORD.

COLLECTIVE AUSCULTATION AND THE REGISTRATION OF HEART SOUNDS

To the Editor of THE LANCET

SIR,—Dr. Vaughan Henriques's interesting paper in your issue of March 20th leads me to give you an account of my own researches. With the help of my assistant, Mr. G. Minot, engineer E.P.C.I., an apparatus has been invented which makes it possible (1) to reproduce by loud-speaker the murmurs and sounds of the heart, and (2) to register on films and records the sound vibrations heard in the loud-speaker. Our instrument, which was standardised by the firm Petit (Ezanville, Seine-et-Oise, France), has been in use for two years in my service at the Tenon Hospital in Paris. It was shown at the International Cours Tomarkin in Spa (Belgium) in September, 1935, to the Société des Médecins des Hôpitaux de Paris on May 15th, 1936, and to the Société de Biologie on May 16th, 1936. It is made in three parts: the *telestethophone*, for collective auscultation; the *phonostethograph*, for registering the sounds on films; and the *medical pick-up*, for registration of sounds on records and their subsequent reproduction. It has been made especially for the heart, but we have made use of it also for the arteries, lungs, and abdomen.

The *telestethophone* includes a microphone, an amplifier, and a loud-speaker. The microphone is intended to catch and transform into electric waves the audible vibrations of the chest-wall. Its special structure renders it insensitive to the infra-auditory vibrations of this coat and also the vibrations of the air. For this last reason, the sounds diffused by the loud-speaker have no influence on the microphone; it is therefore quite possible to speak near the patient without interfering with the clearness of the auscultation and to place him near the loud-speaker without any screen in between. The amplifier is regulated so as to amplify the electric oscillations, the frequencies of which are included in the audible scale of the auscultation phenomena (20 to 800 periods a second). It is placed in a metal portable box 20 in. long by 10 in. wide by 12 in. high. The telestethophone has neither dry battery nor accumulator and is connected to the main. To make it work, one needs only to press two knobs, one of which regulates the intensity, the other the tone.

The *phonostethograph* is included in the box of the telestethophone. It consists of a special oscillograph joined to the loud-speaker and permitting the registration of the vibrations on a film as they are heard. This apparatus has also been made without a loud-speaker but with one or two head-phones for hearing. The sensitiveness of the normal ear varies greatly according to the frequency of vibrations, and the oscillograph has been regulated so that its sensitiveness resembles that of the ear for vibrations of 20 to 800 periods a second. The reproduction of heart sounds (phonocardiogram) is thus rendered as exact as possible and its interpretation is made easier by the simultaneous registration, for example, of the electrocardiogram on the same film. A tracing "with notches" (*en dents de scie*) can also be made.

The *medical pick-up* allows us to engrave on a record the cardiac sounds and murmurs heard in the loud-speaker or ear-phones of the telestethophone. A special little apparatus allows us also to engrave on the record oral explanations of the sounds heard. The medical pick-up, when used alone, gives faithful reproduction, by loud-speaker, of the sounds registered. A special process of registration and of reproduction enables us to eliminate the noise of the friction of needles. Records of the auscultation of the heart (*stéthodiscs*) are being prepared for issue.

This instrument is useful for teaching because it enables a whole class of students to hear a patient's heart or the records made from auscultation. It is also of value at medical meetings for the presentation of interesting cases. From a practical point of view, it enables us to follow the sounds and murmurs of the heart at various periods of an illness, and leaves us "documentary" evidence of previous conditions. Thus in Paris it has been adopted by the Ministry of Pensions. Lastly, from a scientific point of view, the study of films is rich in new ideas.

I am, Sir, yours faithfully,

C. LIAN,
Professeur Agrégé in the Medical Faculty of Paris and Physician to the Paris Tenon Hospital.

Paris, April 4th.

OBITUARY

FREDERICK STAPLETON DICKEY HOGG, M.R.C.S. Eng., L.R.C.P. Lond.

WE regret to learn of the death of Dr. Frederick Hogg, for 35 years medical superintendent of the Dalrymple Home for Inebriates, Rickmansworth, which occurred at a nursing-home at Brighton on April 5th.

The elder son of the late Sir Frederick Hogg, Director-General of the Post Office of India, he was educated at Repton and Jesus College, Cambridge, and went for his medical training to St. George's Hospital. His career at the hospital was broken by an interval of some three or four years, during which he was engaged in sheep farming in Australia, but on his return to the hospital he took the English double qualifications in 1888. He held appointments at the West London Hospital and the Ear, Nose, and Throat Hospital, after which he went to India in the service of the Bengal-Nagpur Railway. At the expiration of his appointment as chief medical officer to the railway, he returned to England and entered for a short time into a partnership in north London. His wife's health led him to leave London and take a practice in Southminster, and while there he was elected medical superintendent to the Dalrymple Home for Inebriates, Rickmansworth. This position he occupied for 35 years until the institution was wound up under the conditions of its foundation. At the Dalrymple Home he made a name for himself in the treatment of inebriety. His management of the patients was sympathetic and remarkably successful, while his notes on drug habits were the result of careful and ingenious attention, many of his experiments on the effects of the remedies employed, and their dosage and periods of administration being attended with success often of a permanent nature. He took his patients into his confidence and made them the intelligent assistants of their own treatment, inviting them also to keep in regular touch with him, especially through their own doctors. He was asked on many occasions to record his experiences, but always seemed unwilling to do so, the one exception being the article on drug habits in "Quain's Dictionary of Medicine." But the practical nature of his insight into inebriety was known to many colleagues who consulted him, and was often of valuable assistance to THE LANCET.

Dr. Hogg had lived in retirement at Brighton for the last three years, a cardiac condition entailing upon him a very quiet life. His devotion to the interests of his patients in a residential institution which he never seemed free to leave led to the making of few personal friends, but to those who knew him his simple and generous nature as well as his all-round knowledge of his work made a strong appeal. He had been a widower for some years and leaves one son.

FRANCIS GARLAND COLLINS, M.R.C.S. Eng. D.P.H.

Dr. Francis Collins, medical officer of health for West Ham, who died on March 30th, was a distinguished public servant. He received his medical education at University College, London, and the London Hospital and took the English double qualification in 1907. After serving as house physician to the London Hospital he was appointed assistant medical officer to the Whipps Cross Infirmary and from that time his whole professional life was spent in municipal medical work. He was appointed assistant medical officer, becoming later senior resident medical officer at the Plaistow Fever Hospital and was tuberculosis officer at West Ham when he took a commission in the R.A.M.C. He saw service throughout the war, first at home and then in Servia and with the army at Salonika. He returned to his duties as tuberculosis medical officer, and in 1924 was appointed medical officer of health for West Ham, a position which he held at the time of his death. He earned golden opinions by his work, paying special regard to maternity and child welfare, while the reduction in the maternal mortality-rate in the district under his supervision was remarkable enough to obtain special comment in the House of Commons from the Minister of Health.

Dr. Collins made communications to THE LANCET of a valuable character. In 1920 he related the after-history of 570 tuberculosis dispensary cases, being at that time medical adviser to the West Ham insurance committee. He gave facts and tabular statements in support of the views that it is seldom that any but early cases derive permanent benefit from sanatorium treatment, and that much more strenuous preventive measures should be adopted, such as the foundation of additional suitable open-air schools and institutions for very advanced cases. He collaborated with Dr. Helen Campbell, then assistant medical officer for maternity and child welfare at West Ham, in reporting a series of cases of pemphigus neonatorum in which the practical conclusions were arrived at that any midwife or doctor who had been in contact with a case should not attend another confinement until after thorough disinfection of both person and belongings, adding that the disease should be made notifiable.

Dr. Collins had been in bad health for a long period, the result of dysentery incurred during his war services, and for the last five months of his life he was confined to bed. He was only 55 years of age at the time of his death.

CÉCILE BOOYSEN, M.R.C.S. Eng.

THERE are very many who have learned with regret of the death on April 7th of Dr. Cécile Booysen. This occurred after an illness of five weeks' duration at the age of 42. Her career was that of a woman of outstanding vigour and strong personality. She was the daughter of a South African farmer who, having determined to become a doctor, borrowed the money necessary for her medical education. After attending classes at King's College, she went for clinical training to Charing Cross Hospital and in 1926 obtained the English double qualification. She served as house surgeon at Charing Cross Hospital and acted also as clinical assistant at the Paddington Green Hospital for Children. She then went into practice in north London and in 1935 founded a voluntary birth control clinic, the Goswell Women's Welfare Centre, in a very poor and overcrowded district. Her environment as well as her natural impulses led to a deep interest in politics, which manifested itself in her support of the labour policy. The horrors of war made a strong impression upon her, and after attending the Brussels Peace Conference in 1936 she started and worked actively for the Medical Peace Campaign where she acted as honorary secretary.

Prof. J. A. Ryle writes: "The news of Dr. Cécile Booysen's death will have brought grief and distress to all who knew her. Among the many able women doctors in London, she belonged to a group and a generation which stands particularly high in my estimation, and established unobtrusively a position which will cause her to be long remembered and revered. It was a privilege to meet her in consultation and to observe the care and thought and consideration which she devoted to her patients and which in turn earned their evident devotion to her. She was the organising secretary and inspiration of the Medical Peace Campaign in this country, and in her conduct of its affairs she must have expended a great deal of the energies of her later months. Whatever success attends this movement in the years to come—and it must be recognised as one of the first serious attempts to investigate the psychological causes and consequences of war, and to study and anticipate the medical problems associated with war—a very great measure of that success must be attributed to her self-imposed task. That task had for its goal the better and safer world for which we all hope but few so assiduously strive."

RICHARD WHITTINGTON, M.D. Oxon.

Dr. Richard Whittington, whose death occurred at Hove on March 30th, was educated at King's College, London, and Merton College, Oxford, proceeding for his medical training to St. Thomas's Hospital. He took honours in the natural science tripos at Oxford and graduated as M.B., B.Ch. in 1898, proceeding to the M.D. degree at a short interval. At his hospital he held for a time an appointment in the skin department and was later resident medical officer at the Royal Free Hospital, and house physician and pathologist at the Sussex County Hospital, Brighton. He acted for a time as surgeon to the Second African Field Force and recorded his experiences in a paper in *Treatment* entitled "Prophylactic Measures against Enteric Fever in Armies." He settled in practice in Brighton over thirty years ago and became prominent alike as practitioner and public worker. He was an active member of the British Medical Association, holding the post of chairman of the Brighton division, and being a representative at the recent annual meeting at Oxford. During the war he served on the staff of the 2nd Eastern General Hospital which was officered by the R.A.M.C.

Dr. Whittington will be long remembered in the borough for his public work. He was a member of the old Brighton board of guardians and served on the education committee of which he was chair-

man. He was for twelve years a member of the Hove town council, and served continuously on the East Sussex council of which body he was at the time of his death an alderman. He was on the directing bodies of the Brighton, Hove, and Sussex Grammar School, the Brighton Technical College and School of Art, and the Hove County School for Girls. The conscientiousness with which he performed all his public duties was illustrated by the record of his attendances, for during the year 1935–36 out of 152 summonses to meetings by the Hove town council and the Hove education committee, he attended 138 times. During the last year of his life he suffered from cardiac symptoms which made of this energy a remarkable record of devotion to duty.

Dr. Whittington married a daughter of the late Mr. E. L. J. Ridsale of Rottingdean, a sister of Mrs. Stanley Baldwin. She predeceased him, leaving one daughter who was a frequent companion of her father at social functions where official positions made his presence necessary.

THE LATE PROF. C. C. CHOYCE

Dr. Arthur Davies writes: "So deeply do we revere the memory of Charles Coley Choyce at the Seamen's Hospital that it would be a dereliction of duty not to support the appreciations of his worth that have been so well expressed by his friends at University College Hospital. Coming to us as house surgeon to Mr. William Turner in 1902, he returned in 1905 as medical superintendent, succeeding Mr. Johnson Smith who had held that post with great distinction for over 40 years. His appointment coincided with a change of policy as regards the staffing of the hospital, and this was effected with characteristic courtesy by Choyce, who always referred to his predecessor as 'that great gentleman J. S.' In 1907 he was appointed assistant surgeon, and became teacher in operative surgery, worthily upholding the high traditions that had been established at the Seamen's Hospital. In the same year he was selected to shoulder another heavy responsibility, being appointed Dean of the London School of Clinical Medicine, an adventurous essay into post-graduate teaching undertaken by the staff of the Seamen's Hospital, and by extramural lecturers of eminence. The daily task of coördinating the activities of such an unparalleled combination of teachers was successfully carried out by Choyce, notwithstanding the constant difficulties of finding adequate material suitable for clinical demonstrations. The fierce protests made by the teaching staff, rightly importunate for such material, were met with equanimity and serenity, and peace was marvellously conserved as none misdoubted his motives, none his absolute integrity. It was at this period that Sir Malcolm Morris, one of the post-graduate teachers, selected Choyce as editor of the now famous 'System of Surgery,' and again a difficult task was carried through with conspicuous success. At that time Choyce was a young and relatively junior surgeon, and it was not easy for him to coördinate the strong individualistic opinions of his distinguished contributors; nevertheless his editorial blue pencil prevailed. During this period began his friendship with Mr. Gwynne Williams and their daily discussions on current surgical practice were a happy blend of pungency and good humour. Little did either think that this friendship was to be consummated at a later date in common service to University College Hospital. In 1912 Choyce became senior surgeon and in 1919 consulting surgeon to the Seamen's Hospital. Associating ourselves with all that has been so well written of him, we would recall how often it fell to Choyce to undertake tasks that were arduous and extremely difficult, and how consistently he succeeded. At all times and in all places he was unchangeably himself, 'in loco parentis' to all and sundry, serene, valiant, and wise. Our thoughts go out to his father in New Zealand and to his wife to whom we owe our especial gratitude for his comradeship vouchsafed to us and which is now our precious heritage."

PARLIAMENTARY INTELLIGENCE

PHYSICAL TRAINING AND RECREATION BILL

IN the House of Commons on April 7th Mr. OLIVER STANLEY, President of the Board of Education, moved the second reading of the Physical Training and Recreation Bill. He said that Clause 1 of the measure gave statutory authority to the National Advisory Council which had been at work since March 1st. Clause 2 provided for a scheme of local committees whose membership would be like that of the National Council—invited to serve as individuals rather than nominated as representatives of different bodies. Those committees would be charged with propaganda and with seeing that the scheme and its possibilities were brought home to the locality, and would examine applications from voluntary bodies for assistance from the Government. All such applications would be submitted by them to the Grants Committee which was dealt with in Clause 3. Sir Henry Pelham would be chairman of the committee. Clause 4 was a machinery clause which dealt with the powers of local authorities. The most important new power was that given to a local authority to provide throughout the area that sort of community centre which at the present moment a housing authority could provide on its own housing estate, but which the local authority was not able to provide anywhere else. Clause 5 dealt with the compulsory purchase of land and Clause 6 remedied the difficulty under the Education Act which enacted that if the local education authority provided certain facilities for social recreation and physical training they had unlimited powers for children under 18, but powers in regard to those above that age only if they attended educational institutions. The same powers would now exist in regard to those above 18 as in the case of the younger children. Clause 7 dealt with the setting up of the national college. The whole scheme was now ready for submission to the National Advisory Council. He still heard criticisms that this scheme was militaristic, but the leaders in the physical health movement on the Continent had not been in the past, and were not now, Germany and Italy, but Sweden, Czechoslovakia, the democratic popular States, and he thought that we could draw valuable lessons from the systems adopted in those countries. Those systems had no element of compulsion and were not applicable as a whole, for it was not wanted to substitute physical training for games, but to supplement games by physical training. The "keep fit" slogan was one of the best ever invented. What was not so widely known was the remedial effect that physical training could have, and that wise training given under proper instruction, and with a scientific basis, could do much to remedy some of those minor, and indeed some of the major, ills to which a highly civilised and industrialised society was liable.

Attempts had been made to found arguments against this scheme upon a nutritional basis, but this was an entire mistake. The machinery necessary

to ensure that the school child should come to physical training with a well-nourished body was in existence, and if it was properly used there should be no malnutrition in our schools. He was determined that that machinery should be used, and he appealed to all hon. Members to help him in impressing the importance of this machinery on local education authorities in their areas, and in inducing them to put it into the fullest possible operation. He would remind the House that the recent block grant made available largely increased sums to the local authorities on which services of this kind might well have the first call. Anyone who read the First Report of the Advisory Committee on Nutrition would gather from its whole tenor that the picture of a nation in general suffering from malnutrition was a false one. The committee laid stress on the possibility of extending the consumption of milk both in the schools and afterwards. That report would, of course, receive careful consideration from the Government. It was a difficult and not wholly an economic problem; it was not just a question of the price of the product and the pocket of the purchaser, but a question of taste, of belief in it, and although a child could lead a man to a milk bar a whole Cabinet could not make him drink.

This was a scheme not only for physical training, but also for recreation. It was part of a problem just as important, namely, the use of leisure. Leisure was to be different not only in content, but in quality from anything that the general masses of the people had experienced up to now. It was going to be regular and not spasmodic. What use were we going to make of such leisure? He was quite certain that regular leisure of the kind he mentioned would demand some more active occupation than just sitting about and resting. The real use of leisure would call for the development of interest, taste and knowledge. Physical recreation, vigorous games, physical training, and hiking would form an important part of any right use of leisure, but it could not be all. He did not believe that physical activity alone was ever going to be wholly satisfactory, but the facilities provided for in this Bill might well lead to the development of other and wider interests.

Mr. LEES-SMITH thought there was a great deal of exaggeration in the belief that strenuous physical exercises up to about 25 years of age would guarantee health for the rest of a long life. Lord Dawson, in a letter to the *Times* a few days ago, had pointed out that he had seen a group of territorials marching—here they had very selected men—and he carefully noted them and came to the conclusion that 50 per cent. of them were suffering from physical defects which mere exercises would not remedy, and which would take a heavy toll in later life. Lord Dawson, was one of the two medical members of the committee controlling the scheme, and he wished there had been more. The scheme needed not only the development of remedial exercises, but the development of open-air recreation, differing in type from violent physical exercises.

A matter which was quite definitely at issue between the two sides of the House was the connexion between this scheme and the problem of nutrition. He knew that the Board of Education had issued figures showing that the number of children in which nutrition was apparently bad, and who would come under the scheme, was 0·7 per cent. He did not think that the record of the Board of Education on this question of the proportion of children suffering from malnutrition was a very reliable one. The figures were based upon the impression made on medical officers of health by looking at children. It was clear that the standard taken by a medical officer of health in looking at children was that to which he was accustomed in the neighbourhood in which the school was situated. According to that standard—if they took it as a standard—they got the figure of 0·7 per cent. with bad nutrition, and 74 per cent. who were normal. The whole basis of attempting to judge this problem by the method of looking at the children in front of them, and asking whether they were up to the average of the neighbourhood, was entirely unscientific and was now being condemned.

Mr. STANLEY: When the right hon. gentleman says that the method is now being condemned, may I point out to him that the Nutrition Advisory Committee say that the method of the Board of Education is the most promising?

Mr. LEES-SMITH said that the committee added that the trial had not been sufficiently prolonged to establish its reliability and the method was not reliable. There was another method which scientists said gave results—viz., the calculation of the number of proteins, calories, and vitamins required for physical efficiency at different ages. Then one calculated what it cost, taking the average over a group of people, to buy sufficient food to provide the minimum essentials of those elements. Then one calculated what proportion of the people of this country were buying that food and could afford to buy it. Those were the methods which were being followed up by the Committee on Nutrition, which had not yet reached a final conclusion as to what percentage of the population, judged by this method, would be found to be suffering from malnutrition, but individual members had reached their own conclusion. They could take either of the two limits, the report of the British Medical Association, which stated that 30 per cent. of the school population were suffering from malnutrition, as against the 0·7 per cent. of this report, or the report of Sir John Orr, who was a member of the committee, and who had come to the conclusion that the optimum diet was absent from 50 per cent. of the school-children. The most valuable part of the Government scheme would undoubtedly be that it would force open the whole issue of the standard of living of the people of this country.

Sir FRANCIS ACLAND said he welcomed the Bill. Undoubtedly it was a move in the right direction, and would do great good. But he was sure that the campaign which it would be necessary to have behind this Bill to ensure better physical training and recreation would have gone better in that House if it were being more visibly connected with, and accompanied by, a preliminary campaign for better nutrition.

Viscountess ASTOR said she begged the Government when considering the question of physical fitness to bear in mind that there was no other way that they could get the children properly trained, fed and matured except by beginning before they got into school. No child under 18 ought to work more than 40 hours per week. If they attended to that they might in time get a really A 1 nation.

Mr. EDE said that the nursery school had its place, but they must be very careful to see that it was not made an excuse for bad social conditions.

After further debate,

Mr. SHAKESPEARE, Parliamentary Secretary to the Board of Education, said that his right hon. friend had every reason to be gratified at the reception given to the Bill by members of all parties. The Government had appointed a body of experts on nutrition who he hoped would educate the layman in the course of time.

It was moonshine to conceive that the people who might come under this Bill—that was to say, some 14,000,000 persons between the ages of 14 and 35—were so enfeebled by lack of nourishment that they could not stand up, let alone take any recreation. Mr. Lees-Smith, he thought, had rather confused two things—the assessment of the nutritional state and the means to be taken to overcome any deficiencies in the nutritional state. Although the present system of assessing nutrition was not foolproof, it was the best yet devised, and indeed the experts said that it was the best at present known. He assured the right hon. gentleman that if research would find a better one—and he believed that the League of Nations was trying to find a better one—the Government would consider it with a view to adopting it.

The Bill was read a second time and the financial resolution in connexion with it was agreed to in Committee.

EXTENSION OF CONTRIBUTORY PENSIONS SCHEME

In the House of Commons on April 8th Sir KINGSLEY WOOD, Minister of Health, moved the second reading of the Widows', Orphans', and Old Age Contributory Pensions (Voluntary Contributors) Bill. He said that the measure would concern at least 2,000,000 persons, enabling them to participate in the benefits of the Widows', Orphans', and Old Age Contributory Pensions Act on a voluntary basis. Persons who had received these benefits were, broadly speaking, those who were already compulsorily insured under the National Health Insurance Act, or who having once been insurably employed, had elected to become voluntary contributors. There had been one considerable gap in the provisions of the principal Act. There had been persistent requests from a section of the community, many of whom paid to provide for others this protection which they needed just as much themselves. Our scheme of social insurance, considerable and extensive as it was, could not be regarded as complete so long as persons with small means, but not themselves insurably employed, were unable to share in its benefits. This Bill had been popularly called "The Black-coated Workers' Bill." That did not by any means adequately describe its scope. It would be almost impossible, even if it were desirable, to make a scheme of this kind compulsory, because experience had shown that compulsory contributions could be successfully collected only when linked with the payment of wages. It was essential, that if the scheme was not to be unfair between applicants, and not indefensibly expensive to the taxpayer, they must lay down two broad principles. In the first place contributions in a scheme of this kind should increase with the age of entrants, and as there was to be no medical examination whatever, there must be a substantial waiting period before benefits were payable. They had been able to make provision for continuance in insurance even when full contributions had not been paid, and for maintaining the insurance of a contributor who was unable to pay contributions owing to protracted illness which prevented him from earning a living. The Bill permitted of entrance within a year of the inception of the scheme at a favourable flat rate subject to a maximum age limit of 55. The great majority of the men who entered would be married and many of them would be getting on in years. The scheme would naturally be most attractive to them, but the insurances provided for in the scheme were mainly for the benefit of women. Its chief attraction for men would be that it enabled them to make provision for widows and children in the event of premature death, and he would point out that of the 1*s.* 3*d.* asked for under the scheme nearly a shilling was apportioned for making provision for the wife, widow, or children. The Government Actuary put the number of unmarried women of middle age at 500,000 who would satisfy the conditions of eligibility in the first year of the scheme. The difference between the £400 a year income limit for men and the £250 a year income limit for women was not one of sex differentiation at all. It had relation to the responsibilities of the burdens that had to be carried. The greater part of the man's risk was the security of his wife in her old age, or his widow and children in the event of his premature death, and there was no such cover available for him in any insurance institution on any terms that he could afford. Under this scheme the Government gave adequate benefit and security according to needs, circumstances, burdens, and responsibilities in a fair and proper way. As far as the State contribution and help was concerned, if anything, it erred in favour of women rather than men. He could promise the House that he would examine the precise terms of the measure when it reached the Committee stage, but he commended it to the House as one more measure of British social security and justice, and one which he suggested would take a considerable place among social services which were unequalled in the world.

After further debate, the Bill was read a second time and the financial resolution in connexion with it was agreed to in Committee.

The financial resolution in connexion with the Physical Training and Recreation Bill was agreed to on report.

THE FACTORIES BILL IN COMMITTEE

The Factories Bill was further considered by a Standing Committee of the House of Commons on April 8th. Major LLOYD GEORGE was in the chair. Examination was begun of Part IV of the measure, which deals with special provisions and regulations in relation to health, safety, and welfare.

Clause 46 (which prescribes that where a process in a factory causes dust or fumes likely to be injurious or offensive, measures shall be taken to protect the workers and to prevent the accumulation of dust or fumes in a workroom).

Mr. RHYS DAVIES moved an amendment to insert the words "or other impurity." He said that there were other impurities which were altogether outside the description given in the clause.

Mr. G. LLOYD, Under-Secretary, Home Office, said that on further inquiry the Home Office found that there were impurities which would not strictly be covered by the words in the clause. They were therefore ready to accept the amendment with other necessary consequential alterations.

The amendment was agreed to.

On Clause 47 (which deals with washing facilities and meals in relation to certain dangerous trades),

Sir E. GRAHAM-LITTLE moved an amendment to leave out the word "washing" and insert "cleansing." He said he was the only medical man on the Committee and he had received suggestions from expert associations outside Parliament as to what they would desire to put into this Bill. A number of amendments had been put forward by two expert bodies—the Royal Sanitary Institute and the Society of Medical Officers of Health. It had been a common experience with him for patients to show signs of injuries to the skin caused not by the substances with which they had been working, but by materials used for washing their hands. Washing was invariably understood as washing with soap and water, and the purpose of the amendment was to give a wider choice.

Sir J. SIMON, Home Secretary, did not deny that the point had force, but he opposed the insertion of the word "cleansing." The expression "washing facilities" was well-known in the industrial code, and it was most undesirable to introduce at one point a phrase like "washing and cleansing" and to leave the more familiar expression "washing facilities" in other places. No doubt there were certain soaps containing a chemical ingredient which if brought into contact with the skin of persons suffering from a certain ailment might do more harm than good, but that was an argument against washing, and they must take a rather broader view. He doubted whether the legal construction which might be put on these additional words would add to the clearness of the law.

Sir E. GRAHAM-LITTLE said that he had voiced the opinion of the experts, but in view of what the Home Secretary had said he asked leave to withdraw the amendment.

The amendment was withdrawn.

Mr. SHORT moved an amendment giving the Secretary of State power to prescribe by regulations what in practice was a room in which there was sufficient siliceous dust to be dangerous.

The amendment was agreed to.

Mr. RHYS DAVIES moved an amendment which he said was designed to make sure that persons employed in dangerous and injurious processes should not take food or drink in the room where the processes were carried on.

Mr. LLOYD said that if the Committee inserted the amendment in the form in which it was moved they would really be making not a reasonable prohibition but an unnecessary restriction. It was essential in regard to the dust which it was poisonous even to swallow, to provide that workers should not stay in the workroom during their rest or meal periods, and also that they should not swallow the smallest particle of food outside their rest or meal periods. With regard to asbestos or silica dust, it was sufficient to provide, however, that they should not remain there during their meal times or rest periods and thus be inhaling the dust.

The amendment was withdrawn, and Clause 47 as amended was ordered to stand part of the Bill.

On Clause 48 (which provides that the Home Secretary may make such special regulations as appeared to him practicable for extending the provision and use in factories in which the weaving of cotton or other cloth is carried on, of shuttles which are not capable of being threaded or readily threaded by suction of the mouth, and any such regulations may impose duties on workers as well as occupiers).

Mr. RHYS DAVIES moved an amendment to delete the word "special" in relation to the regulations. He said that the habit of what was called "shuttle kissing" had grown up but now both employers and workers would like to do away with it. The Home Secretary should be able to make regulations to deal with the matter without having to go through all the machinery of inquiry that would be necessary if the regulations were special regulations.

Mr. J. HEPWORTH said that most employers provided apparatus for threading a shuttle, but the difficulty was to get the workers to use it.

Sir J. SIMON said it did not appear to have been absolutely proved that "shuttle kissing" caused injurious consequences. It would be very rash if he made regulations on such a matter without making full inquiry. That was the reason why they put in the words "special regulations." They all wanted to stop the habit of "shuttle kissing" if they could and he would undertake to take the matter up as soon as the Bill became law for the purpose of making proper inquiries. He promised to look further into the matter.

The amendment was withdrawn, and Clause 48 was ordered to stand part of the Bill.

Clause 49 (which provides that no person shall use white phosphorus in the manufacture of matches), and Clause 50 (which deals with humid factories) were both ordered to stand part of the Bill with minor amendments.

On Clause 51 (which provides that no work shall be carried on in any underground room, which is certified by the inspector as unsuitable as regards construction, light, or ventilation, or on any hygienic ground, or where adequate means of escape in case of fire are not provided),

Mr. SHORT moved an amendment to make the clause provide that no underground room should be used for work unless it was certified by the inspector to be suitable.

Mr. BANFIELD, supporting the amendment, said that an underground room was not a suitable place for processes to be carried on at all. There were hundreds of underground workrooms that ought to be closed, many were absolute rat-holes.

Mr. LLOYD said Mr. Banfield had referred to underground workrooms which were in the nature of objectionable cellars, but an underground room in the clause meant any room half of which was below the level of the ground. In a number of the luxury flats in the West End of London there were rooms of that kind. The information in the Home Office did not indicate that conditions in regard to lighting and ventilation were generally bad. On the contrary, a comprehensive inquiry had shown that conditions were much better than might be anticipated and that an improvement had taken place. If the amendment was carried a large number of inspectors would be wanted and there would be a considerable delay in dealing with bad cases.

After further debate, Sir J. SIMON said that his advisers took the view, and he did not differ from it, that the clause was in proper form. But he would consider the whole matter again.

The amendment was withdrawn.

On Clause 52 (which provides that a basement bakehouse shall not be used as a bakehouse unless it was lawfully so used at the date of the passing of the Bill into law, and any basement bakehouse which, for a period exceeding 12 months, is not used as a bakehouse shall not be so used again),

Mr. BANFIELD moved an amendment to provide that all existing basement bakehouses should not be used after the expiration of five years after the passing of the Bill into law.

After further debate, Sir J. SIMON said that the proposal in the amendment had only just come before him. It had never been put forward previously in any of the representations made to the Home Office when the Bill was being drafted. It was their policy to discourage the use of underground bakehouses and he was disposed to share the strong feeling shown about the matter. He could not, however, accept the amendment without having an opportunity of consultation.

Mr. BANFIELD agreed to withdraw the amendment, but Mr. G. BUCHANAN objected, and it was negatived.

The clause was ordered to stand part of the Bill.

Clause 53 relating to the temperature of ironing rooms in laundries and fumes in laundries was also ordered to stand part of the Bill.

The Committee adjourned.

The Factories Bill was further considered by a Standing Committee of the House of Commons on April 13th. Major LLOYD GEORGE was in the chair.

On Clause 54, which provides that a young person shall not be employed to lift, carry, or move any load so heavy as to be likely to cause injury,

Mr. RHYS DAVIES moved an amendment to delete the word "young."

Mr. LLOYD, Under-Secretary, Home Office, said that regard should be had to a proviso in the clause empowering the Home Secretary to make special regulations prescribing the maximum weights which might be lifted, carried, or moved by persons employed in factories. That power to make regulations, he said, was regarded as an important way of dealing with special cases and they intended to use that power.

After further debate,

Sir JOHN SIMON, Home Secretary, said that the clause was a new one in the Factory Code and was an improvement. There were already regulations to prevent young persons lifting heavy weights, but they could not put into an Act of Parliament some prohibition which was so vague in its terms that it could not be effectively and fairly applied.

The amendment was withdrawn and the clause was ordered to stand part of the Bill.

On Clause 55, which prohibits the employment of female young persons in any part of a factory where the following processes are carried on: melting or blowing glass, other than lamp blown glass; annealing glass, other than plate or sheet glass; evaporating of brine in open pans or the stoving of salt.

Mr. W. BROMFIELD moved an amendment to include in the prohibition the making or finishing of bricks or tiles not being ornamental tiles.

Sir J. SIMON said there was a new sub-clause which gave the Home Secretary power to extend the clause by regulation to any process in which it appeared undesirable that female young persons should be employed, and if he was satisfied that the prohibition

referred to ought not to apply to any of the processes specified, or ought to be relaxed, he might make regulations accordingly.

The amendment was negatived and the clause was ordered to stand part of the Bill.

On Clause 56, which prohibits the employment of women and young persons in certain processes connected with lead manufacture,

Sir E. GRAHAM-LITTLE moved an amendment to exclude women from the prohibition. He said there was no evidence that women were more subject to lead poisoning than men. A discrimination of the kind proposed in the clause would operate against the employment of women.

Viscountess ASTOR supported the amendment. Anything that would shut out women from any employment would be resented by them.

The amendment was negatived and the clause was ordered to stand part of the Bill.

Clause 57, which includes provisions in regard to the employment of women and young persons in processes involving the use of lead compounds, was ordered to stand part of the Bill.

Clause 58 (which gives the Home Secretary power to make special regulations for safety and health), Clause 59 (prohibition of importation and sale of articles made with prohibited materials), Clause 60 (power to take samples), Clause 61 (certificates required before approval of building plans relating to cotton cloth factories), Clause 62 (notification of accidents in factories), and Clause 63 (power to extend dangerous occurrences provisions as to notice of accidents) were all ordered to stand part of the Bill.

On Clause 65, which requires notification of certain industrial diseases,

Mr. ELLIS SMITH moved an amendment to delete the list of diseases specified in the clause (lead, phosphorus, arsenical or mercurial poisoning, or anthrax) and substitute the definition "any industrial disease to which the provisions of Section 43 of the Workmen's Compensation Act, 1925, apply or silicosis."

Sir E. GRAHAM-LITTLE supported the amendment. Sir J. SIMON opposed it and the amendment was withdrawn.

The Committee adjourned.

NOTES ON CURRENT TOPICS

Voluntary Sterilisation

In the House of Commons on April 13th on the motion that the Speaker do leave the chair on the House going into Committee of Supply on the Civil Estimates,

Wing-Commander JAMES called attention to the need to implement the report of the Committee on Voluntary Sterilisation, and moved "that, in the opinion of this House, the Government should give further consideration to the potentialities of voluntary sterilisation for hereditary defectives in accordance with the unanimous recommendations of the Departmental Committee that reported to the Minister of Health on Jan. 8th, 1934."

Sir KINGSLEY WOOD, Minister of Health, replying to the debate which followed, said there wasno question that opinion in this country was growing in favour of sterilisation, but they could not disguise from themselves the fact that opposition remained and that there was still much conflict of opinion, particularly on religious grounds. The medical profession were by no means unanimous on the matter. It was desirable that ample time should be given for full consideration of the whole problem and for public opinion to develop, as he thought it was developing.

Wing-Commander JAMES said that in view of what the Minister had said he would withdraw his motion.

Mr. ROWSON called attention to the question of nutrition.

Sir KINGSLEY WOOD said that the Ministry of Health Advisory Committee on Nutrition in their most valuable first report said that a good deal of further information on the facts must be obtained before it was possible to reach a final policy on nutrition. He had asked the authorities to review the scale of income observed in connexion with the requirement for repayment for milk or for food supplies. He had also asked the authorities to consider afresh the question of a properly organised system of meals, and he had reason to believe that the authorities would be able to continue and extend the work they were now doing. The Department would undertake certain dietary surveys which the Advisory Committee recommended. This would take time, but would not stop the work now going on.

The motion that the Speaker do leave the chair was carried by 161 votes to 120.

QUESTION TIME

WEDNESDAY, APRIL 7TH

Underground Protection against Air Attack

Major STOURTON asked the Home Secretary to what extent underground protection would be made available to the civilian population of London in the event of an air attack.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: Where accommodation exists below ground level which can be suitably protected against splinters, falling debris, and poison gas, the occupiers of premises will be advised to make use of it. As, however, underground accommodation is rarely proof against a direct hit by a high explosive bomb, the overriding consideration in the choice of air-raid refuges must be to keep the population well dispersed in splinter-proof and gas-proof accommodation, whether it is below or above ground level.

Medical Jurisprudence

Captain ELLISTON asked the Home Secretary whether, in accordance with the recommendations of the advisory committee on the scientific investigation of crime, it was proposed to establish a medico-legal institute for pathological research and as a training centre for experts in medical jurisprudence.—Sir JOHN SIMON replied: The Committee's report is primarily concerned with measures for improving medical education in certain directions; while I am in sympathy with their recommendations they fall also within the province of the Minister of Health, with whom I am in consultation on the matter. My hon. friend will, of course, appreciate that the Committee's proposals would involve a substantial charge upon the Exchequer.

Medical Research Council and Silicosis

Mr. JAMES GRIFFITHS asked the Lord President of the Council what progress had been made by the Medical Research Council in their investigations into the problem of silicosis, and other lung diseases, among coal-miners; and whether he could give any indication as to when the committee's investigation would be completed.—Mr. RAMSAY MACDONALD replied: The standing committee appointed by the Medical Research Council to direct research into disease of the lungs among industrial workers has already promoted several investigations into silicosis and other conditions; the results have been published in a series of official reports and scientific papers. These researches were in most cases not specially directed to the particular problem of lung disease among coal-miners, but during recent months attention has been concentrated on this, and a scheme of intensive investigation in South Wales has been initiated. The work already done shows the problem to be one of great difficulty and complexity, and the investigation is not likely to be completed in less than two years.

Mr. J. GRIFFITHS said that in view of the unsatisfactory nature of the reply and the position of the men who were affected he would raise the matter at the earliest opportunity.

Hospital Treatment in Staffordshire

Mr. MANDER asked the Minister of Health if he was aware of the great dissatisfaction caused in Wednesfield and Willenhall as a result of the coming into force on

April 1st of the new arrangements for the treatment of invalids, both public assistance applicants and hospital contributors, under the new Staffordshire County Council scheme; if he realised that it was now necessary for patients to be taken a distance of from 8 to 10 miles to Wordsley Institution instead of receiving treatment in the immediate vicinity at the New Cross Hospital of the Wolverhampton Borough Council; and what resident medical officers were available at Wordsley for the treatment of these patients.—Sir KINGSLEY WOOD replied: The plans of the Staffordshire County Council for the reorganisation of hospital and other institutional accommodation in the county include the reconstruction of the present institution at Wordsley as a general hospital to serve the sick in the southern part of the county, and I have given my consent to this proposal. The hon. Member will appreciate that the improvement of institutional services and the better classification of patients, which were one of the objects of the Local Government Act of 1929, must sometimes involve the removal of certain patients to a greater distance from their homes, but if the hon. Member has any particular cases of hardship in mind I will make inquiries. With regard to the last part of the question, I understand that the medical officer of the Wordsley Institution lives near at hand and is always available, and that the council propose to appoint a resident medical officer or officers as soon as the reconstruction permits.

Overcrowding in Croydon District

Dr. SALTER asked the Minister of Health whether he was aware that, despite the serious shortage of accommodation available at rents within the means of the lower-paid wage-earners in the Croydon district and the grave overcrowding prevalent in the area, the Corporation of Croydon had made regulations under which an applicant for a municipal house must have resided in the borough for a period of at least 10 years to render such applicant eligible for a dwelling let at a rent of less than £1 per week; and whether such a policy had his approval.—Sir KINGSLEY WOOD replied: I understand that the regulations made by the town council include a condition to the effect mentioned, but that this condition is relaxed in the case of overcrowded families, persons displaced by slum clearance and the abatement of overcrowding, and other cases where special circumstances exist. My approval is not required to the regulations made by local authorities for the management of the houses provided by them.

Cost of Living Inquiry into Family Budgets

Mr. SANDYS asked the Minister of Health whether it was the intention of the Government to institute the inquiries into income distribution, family budgets, and diet recommended by the Advisory Committee on Nutrition in their recent report, in so far as these were not already covered by existing investigations.—Sir KINGSLEY WOOD replied: Yes, Sir. The dietary surveys have already commenced. As regards family budgets, it is hoped to obtain information as to food consumption in the course of the inquiry which is being undertaken by my right hon. friend, the Minister of Labour, for the purpose of the revision of the cost of living index number. The method of carrying out the remaining proposal is receiving immediate consideration.

MONDAY, APRIL 12TH

National Health Insurance Referees

Mr. GRAHAM WHITE asked the Minister of Health how many referees had been appointed under Section 90 of the National Health Insurance Act, 1924, and the rates of their remuneration.—Mr. HUDSON, Parliamentary Secretary, Ministry of Health, replied: The number of referees in England and Wales is eight, and their remuneration is a fee not exceeding 10 guineas a day, or 12 guineas where a hearing extends beyond seven hours.

Supervision of Nursing Homes

Miss RATHBONE asked the Minister of Health (1) whether he would institute an inquiry into nursing-homes all over the country, in view of the many complaints as to the inadequate and insufficiently qualified nursing staffs and the insufficient precaution taken in regard to the prevention of infection; and (2) whether he had reason to believe that nursing-homes were adequately inspected from the point of view of the sufficiency and qualifications of the nursing staff, and also that adequate care was given to the prevention of infection, particularly when maternity patients were taken in addition to general medical and surgical cases.—Mr. HUDSON replied: The attention of local authorities has recently been called to the importance of the adequate supervision of nursing-homes in a circular letter of Sept. 30th last. As at present advised my right hon. friend sees no necessity for a special inquiry, but he will look into any case which the hon. Member may have in mind if she will communicate the particulars to him.

Nursery Schools

Mr. LYONS asked the President of the Board of Education the latest progress in the development of nursery schools; and what proposals were in immediate contemplation.—Mr. GEOFFREY SHAKESPEARE replied: The present position is that 86 nursery schools are recognised by the Board of Education, of which 83 are recognised for purposes of grant, and three as efficient but not in receipt of grant. In addition, 34 proposals for new nursery schools have been approved in principle and in a number of these cases final plans have been approved by the Board, and seven proposals are at present under consideration.

TUESDAY, APRIL 13TH

National Health Insurance Drug Fund

Colonel ROPNER asked the Minister of Health whether, in view of the incidence of sickness during the early months of the present year, he proposed to make special provision to ensure that the Drug Fund should be able, at the end of the year, to meet in full its liabilities to chemists and bodies corporate dispensing under the National Health Insurance Acts.—Mr. HUDSON replied: As the Drug Fund relates to the calendar year it would be premature at this stage to estimate the extent, if any, to which payment of the chemists' accounts will be affected by the sickness experience early in the year. My right hon. friend undertook at the time the present agreement with the chemists was made to consider representations regarding any abnormal deficit in the Fund.

Overcrowding in Scotland

Mr. MAXTON asked the Secretary of State for Scotland what progress had been made since the passing of the Housing Act, 1935, in combating the problem of overcrowding in Scotland; and in how many places had the appointed day been fixed.—Mr. ELLIOTT replied: Since the passing of the Housing (Scotland) Act, 1935, tenders have been approved for 36,012 houses and 24,377 houses have been completed. These houses are not specifically approved for subsidy purposes under either the Act of 1930 or the Act of 1935, but, under arrangements designed to secure that the most economical use is made of the new accommodation they are used for slum clearance or overcrowding purposes as local circumstances or needs may dictate. There is no record of the number of families actually removed from overcrowded houses prior to April 1st, 1936, but from that date to Feb. 28th, 1937, 6444 families living in overcrowded conditions were rehoused. The appointed day under the Housing (Scotland) Act, 1935, has so far been fixed for only one area—namely, the Dysart Ward of the Burgh of Kirkcaldy. The date fixed in this instance is May 15th, 1937.

INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.—This congress will be held at Cairo from Dec. 8th to 15th. Several tours, leaving Marseilles on Dec. 3rd, have been arranged in connexion with it under the auspices of the International Council of Ophthalmology. Visits will be paid to Upper Egypt, Palestine, and Syria. Dr. E. Marx of Rotterdam is acting as secretary-general of the congress, and further details about the tours may be had from the Bureau des Croisières et Voyages Médicaux, 29, Boulevard Adolphe Max, Brussels.

MEDICAL NEWS

University of London

At a recent examination the following candidates were successful :—

D.P.H.

Part I.—Beatrix H. Bakewell, J. S. B. Bray, Enid S. Davies, Sylvia C. Gavron, E. H. Harte, M. U. Hayat, S. M. H. Naqvi, A. W. Rasiah, H. C. Saksena, Margaret B. Steel, M. N. de S. Suriyawansa, and V. M. Vatve.

Sir Ernest Graham-Little has been appointed representative of the University at the celebrations to be held on the occasion of the 400th anniversary of the foundation of the University of Lausanne from June 3rd to 5th.

Three lectures on the meninges and the cerebro-spinal fluid will be given on May 24th, 26th, and 28th, at University College at 5.30 P.M., by Dr. Lewis H. Weed, director of the school of medicine and professor of anatomy in the Johns Hopkins University, Baltimore. Dr. J. Henderson Smith, head of the department of plant pathology at Rothamsted experimental station, will speak on virus diseases of plants at 5.30 P.M. at the Imperial College of Science and Technology on May 13th, 20th, and 27th. Prof. I. M. Heilbron, F.R.S., Sir Samuel Hall professor of chemistry and director of the chemical laboratories of the University of Manchester, will also lecture there at 5.30 P.M. on May 24th, 25th, and 26th. He will speak on the chemistry of the carotenoids and vitamin A. Prof. H. Rein, director of the physiological institute of the University of Göttingen, will lecture at University College on May 3rd, 4th, and 6th at 5 P.M. His subject will be some economising mechanisms as a condition of the body's adaptation to increased activity. It has also been arranged for Prof. H. Fredericq, professor of physiology in the University of Liége, to give a lecture at King's College on interpretation of the normal electrocardiogram. The lecture will take place during June and the date will be announced later. The lectures are open without fee to all who are interested.

The following examiners for the diploma in theory and practice of physical education have been appointed :—

Anatomy.—Dr. Doris Baker and Dr. Lilian Dickson.

Hygiene.—Dr. Ruth Proctor and Dr. James Kerr.

Theory of Gymnastics.—Dr. Anna Broman and Surgeon Commander G. Murray Levick.

University of Birmingham

On May 18th and 20th, at 4 P.M., Prof. Arvid Wallgren, physician-in-chief to the Children's Hospital at Gothenburg, will deliver the Ingleby lectures. The first will be on erythema nodosum and the second on childhood infection and adult type of pulmonary tuberculosis.

From May 24th to June 4th a post-graduate course will be held on the care of the injured workman, and from June 14th to 25th there will be an intensive course in industrial hygiene and industrial medicine. Further information may be had from Dr. Howard Collier at the department of industrial hygiene and medicine at the University.

Provisional arrangements are being made for a post-graduate course in neurology to be given from May to July in hospitals associated with the University. Further information may be obtained on application to the dean of the faculty of medicine of the University, Edmund-street, Birmingham, 3.

Pathological Research in Relation to Medicine

Our advertisement columns contain particulars of a course of lectures on this subject to be given in the institute of pathology and research at St. Mary's Hospital at 5 P.M. on Tuesdays from April 27th to June 22nd. The first is by Sir Almroth Wright, F.R.S., principal of the institute, and the other speakers will be Dr. F. M. R. Walshe, Mr. W. T. Thompson, F.R.S., Prof. E. C. Dodds, Mr. F. T. Ridley, Dr. Wilson Smith, Prof. J. A. Gunn, and Dr. W. E. Gye. An abstract of each lecture will be found in our advertisement columns the week before its delivery. The lectures are open to all members of the medical profession.

Royal College of Surgeons of England

A meeting of the council was held on April 8th with Sir Cuthbert Wallace, the president, in the chair. The Jacksonian prize for 1936 was awarded to Mr. W. E. Underwood, F.R.C.S. (St. Bartholomew's Hospital). The subject for the Jacksonian prize for 1938 will be surgery of the heart. The John Hunter medal and triennial prize was awarded to Mr. L. F. O'Shaughnessy, F.R.C.S., for his research work on the surgery of the thorax.

Mr. Ernest Eric Young and Mr. Arthur George Wells were elected fellows of the college under the charter which permits the council to elect annually to the fellowship, without examination, two members of the college of twenty years' standing.

It was decided that the post of fourth house surgeon at the Royal Surrey County Hospital, Guildford, should also be recognised for the six months' surgical practice required of candidates for the final examination for the fellowship.

Diplomas of membership were granted to A. E. H. Eades (Univ. of Edin.), to K. C. Royes (Univ. of Oxford and St. Thomas's Hosp.), and to Eric Vernon (Univ. of Manch.). Diplomas in child health were granted jointly with the Royal College of Physicians to the following candidates :—

Margaret D. Baber, H. B. Basu, M. L. Biswas, V. S. H. Davies, J. G. H. Frew, J. H. Green, Joyce B. Jewson, Bernard Kenton, A. H. M. Kersha, S. K. Lee, G. K. Lim, Louise A. Matheson, Dorothy Miller, A. L. Smallwood, S. E. L. Stening, Elisabeth J. McQ. Thomas, Enid L. Weatherhead, H. A. Williams, Margaret C. Winter, and Shuan S. Yang.

St. Bartholomew's Hospital Medical College

A post-graduate course open to all will be held at this hospital on June 17th, 18th, and 19th. Further information may be had from the dean of the medical college.

Royal London Ophthalmic Hospital

The Gifford Edmonds prize at Moorfields has been awarded to Mr. J. Bruce Hamilton of Hobart, Tasmania, for an essay on the significance of heredity in ophthalmology. The prize is awarded biennially.

Central Midwives Board

This board has unanimously re-elected Sir Comyns Berkeley as its chairman. Mr. John Bright Banister and Mr. Eardley Holland have been appointed to fill vacancies in the membership of the board.

Toronto Anatomical Session

The fifty-third annual session of the American Association of Anatomists was held on March 25th to 27th at the University of Toronto. Prof. Frederic T. Lewis (Harvard), the president, delivered an address at the dinner on the fundamentals of cell shape. There were 151 papers and thus many of them had to be presented simultaneously. Six round-table conferences were held, covering subjects like sperm production, capillaries, modern conceptions of the neuron, gross anatomical research, heart, and teeth. Anatomy now claims as its own all changes in cells having to do with function, and there were papers dealing with subjects such as the hypophysis, the adrenal and other ductless glands, the adrenal-pituitary relationship in lactation, changes in the adrenals, livers, and thyroids of guinea-pigs as affected by environmental temperatures and thyroxine, and the effect of cortical adrenal extract on sympathetic ganglia of adrenalectomised cats. There was much emphasis on the influence of heredity on form. Some of the papers bordered on the pathological field, such as that on abnormal blood production in hydrops fœtalis. One of many communications on the blood held that lymphocytes could develop in tissue cultures into myelocytes. Other papers were of the older anatomical type, including a notable one on the arrangement of the cranial venous sinuses in the occipital region in man. Various aspects of the nervous system were also discussed. Seven motion pictures were shown, illustrating such phenomena as fœtal behaviour, leg transplantation, and fœtal respiration. An afternoon was set aside for the presentation of sixty demonstrations.

Dr. Charles David Green, who died in St. Thomas's Hospital on Monday, April 12th, aged 75, had retired from practice. Formerly M.O.H. for Edmonton, he practised with success in the City of London. He was exceptionally highly qualified and made useful contributions to our columns and to the *Transactions* of the Pathological Society.

New Maternity Home for Beckenham

At a meeting of the Beckenham borough council recently it was decided to build a new maternity home containing 38 beds at a cost of £49,640.

Falkirk Royal Infirmary

A new nurses' home is needed here and an appeal for £40,000 is to be made. For the first time in the hospital's history an adverse balance is reported; the deficiency on Dec. 31st was £757.

Journées Médicales de Bruxelles

This congress will be held in Brussels under the presidency of Prof. Albert Dustin from June 19th to 23rd. The speakers will include Sir Joseph Barcroft, F.R.S., Prof. D. Danielopolu (Bucharest), and Prof. F. Rathery (Paris). Dr. R. Beckers, the secretary-general, may be addressed at 141, rue Belliard, Brussels.

Greater London Provident Scheme for District Nursing

An inaugural meeting to explain the purpose of this scheme will be held on Monday, April 19th, at 4 P.M., at the Grocers' Hall, Prince's-street, E.C. The scheme seeks to provide an organisation self-sufficient and auxiliary to the existing district nursing services in the metropolitan area. Lord Horder and Miss Mercy Wilmshurst, general superintendent of the Queen's Institute of District Nursing, will be among the speakers. The executive committee may be addressed at 1, Sloane-street, S.W.1.

British Empire Cancer Campaign

In the absence of Viscount Hailsham, Sir Cuthbert Wallace, president of the Royal College of Surgeons, presided at the quarterly meeting of the grand council of the British Empire Cancer Campaign held on April 12th. The council was informed that the campaign would move into its new offices at 11, Grosvenor-crescent, next door to the present offices, on May 1st. The following grants, totalling £2900, were made, in addition to the bulk grants of last November and January: £1000 to be placed at the disposal of Mr. F. Dickens, D.Sc., director of research of the North of England branch of the campaign, at Newcastle, for the continuation of the special "short" wave investigations being carried out under his direction on behalf of the scientific advisory committee at headquarters; £1200 for the purchase of a plaque of radium in use by Dr. F. G. Spear at the Strangeways Research Laboratory, Cambridge; an additional grant of £300 for 1937 to the Westminster Hospital; an additional sum of £300 to Mr. F. C. Pybus for the salaries of his assistants and expenses during the second half of 1937; and a grant of £100 to Mr. L. H. Gray, D.Sc., at Mount Vernon Hospital, in connexion with the neutron investigations.

Sir James Walton was unanimously elected a member of the Council.

Appointments

BARLOW, DONALD, M.S. Lond., F.R.C.S. Eng., Hon. Assistant Surgeon to St. John's Hospital, Lewisham.

BINNING, REX, B.A. Camb., M.R.C.S. Eng., Anæsthetist to the Royal Alexandra Hospital for Sick Children, Brighton, and to the Brighton and Hove Dental Hospital.

DUNCAN, A. S., M.B. Edin., House Surgeon, Hospital for Sick Children, Great Ormond-street.

FRASER, ROBERT, M.B. Aberd., D.P.H., Resident Medical Assistant at the City Hospital for Infectious Diseases, Newcastle-upon-Tyne.

LUMSDEN, A. G., M.B. Aberd., Hon. Assistant Ophthalmic Surgeon to St. John's Hospital, Lewisham.

MACLEOD, HENRIETTA M., M.B. Lond., Assistant Medical Officer for Maternity and Child Welfare Work for Nottingham.

MCNEILL, JANE L., M.D. Belf., L.M., Medical Officer in the Maternity and Child Welfare Department for Birmingham.

ROUSE, A. J., L.R.C.P. Lond., House Surgeon to the Evelina Hospital for Sick Children, London.

WALKER, J. V., M.B. Birm., M.R.C.P. Lond., D.P.H., Assistant Medical Officer of Health and Assistant School Medical Officer for Bootle.

WILSON, REGINALD, M.D. McGill, D.C.H., House Physician, Hospital for Sick Children, Great Ormond-street.

London Hospital.—The following appointments are announced:

GOWAR, F. J. SAMBROOK, M.B. Lond., F.R.C.S. Eng., First Assistant to the Department of Thoracic Surgery;

GAVEY, C. J., M.D., M.R.C.P. Lond., Paterson Research Scholar and Chief Assistant to the Cardiac Department; and

LISTER, ARTHUR, M.B., B.Chir. Camb., F.R.C.S. Eng., First Assistant to the Ophthalmic Department.

Certifying Surgeons under the Factory and Workshop Acts: Dr. F. G. A. BECKETT (Ely District, Cambs); Dr. J. C. S. WELLS (St. Mary's, Isles of Scilly, District, Cornwall); and Dr. C. R. FIELDING (Tarvin District, Cheshire).

Vacancies

For further information refer to the advertisement columns

Alderley Edge, Ancoats Hosp. Convalescent Home, Great Warford.—Hon. Visiting M.O., £50.

Baghdad, Royal College of Medicine.—Prof. of Pathology and Prof. of Bacteriology, each £150 a month.

Barking Borough.—Asst. M.O., £500.

Barnsley, Beckett Hosp.—Res. Surg. O., £300.

***Bath, Royal United Hosp.*—H.S. to Ear, Nose, and Throat Dept., at rate of £150.**

Beckenham, Bethlem Royal Hosp., Monks Orchard.—Cons. Surg. Also Radiologist, 150 guineas.

Blackburn, Calderstones Certified Institution for Mental Defectives, Whalley.—Deputy Med. Supt., £750.

Blackburn Royal Infirmary.—Res. H.S., £175.

Bradford, Royal Eye and Ear Hospital.—H.S., £180.

Bristol Mental Hosp.—Fourth Asst. M.O., £500.

British Postgraduate Medical School, Ducane-road, W.—Three Part-time Demonstrators in Clinical Medicine, each £100.

Canterbury, Kent and Canterbury Hosp.—Hon. Anæsthetist to Ear, Nose, and Throat Dept.

Cheltenham General and Eye Hosps.—H.S. to Eye, Ear, Nose, and Throat Dept., £150.

Chester Royal Infirmary.—H.S., £150.

Chesterfield and North Derbyshire Royal Hosp.—H.S. to Ophth. and Ear, Nose, and Throat Depts., at rate of £150.

Connaught Hosp., Walthamstow, E.—Cas. O., at rate of £100.

Coventry and Warwickshire Hosp.—Res. Cas. O., £125.

Croydon, Mayday Hosp.—Asst. Pathologist and Bacteriologist, £350. Also two Jun. Res. Asst. M.O.'s, each £300.

Doncaster Royal Infirmary and Dispensary.—Cas. H.S., £175.

Eastbourne, Princess Alice Hospital.—Res. H.S., £150.

Edgware, Redhill County Hosp.—Asst. Pathologist, £650.

Edinburgh Royal College of Physicians.—Kirk Duncannon Fellowship for Medical Research, £300.

Edmonton, North Middlesex County Hosp.—Jun. Res. Asst. M.O., at rate of £250.

Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Hon. Asst. Surgeon to Throat, Nose, and Ear Dept. Hon. Physician to Children's Dept. Radiologist, £200. Also Pathologist for Dept. of Morbid Anatomy, &c., £350.

Exeter City and County.—Temp. Asst. School M.O. and Asst. M.O.H., at rate of £600.

Exeter, Royal Devon and Exeter Hosp.—H.P. and H.S. to Ear, Nose, and Throat Dept., each at rate of £150.

Fermanagh County Hosp., Enniskillen.—Surgeon Superintendent, £750.

Grimsby and District Hosp.—Jun. H.S., £150.

Halifax General Hosp.—Jun. Res. M.O., £250.

Hastings, Royal East Sussex Hosp.—Sen. H.S., at rate of £200.

Hertford County Hospital.—Sen. H.S., at rate of £200.

Hosp. for Sick Children, Great Ormond-street, W.C.—Out-patient Med. Reg., £175.

Hove General Hosp.—Jun. Res. M.O., £120.

Huddersfield Royal Infirmary.—Two H.S.'s, each at rate of £150.

Hull Royal Infirmary.—H.P. to Sutton Branch, and Second H.P., at rate of £160 and £150 respectively.

Ilford, King George Hosp.—H.S., at rate of £100.

Kettering and District General Hosp.—Res. M.O. and Second Res. M.O., at rate of £175 and £125 respectively.

King's College Hosp., S.E., Squint Clinic.—M.O., £80.

L.C.C.—Asst. M.O.'s, Grade I, £350. Also Asst. M.O.'s, Grade II, £250.

Lincoln County Hosp.—Jun. H.S., at rate of £150.

Liverpool and District Hosp. for Diseases of the Heart.—H.P., £100.

London Child Guidance Clinic, 1, Canonbury-place, N.—Three Fellowships in Psychiatry, each £300.

London Hosp., E.—First Asst. to Gynæcological and Obstet. Dept., £250.

London Jewish Hosp., Stepney Green, E.—Hon. Clin. Asst.

London Lock Hosp., 283, Harrow-road, W.—Res. M.O. to Male Depts., at rate of £175.

Macclesfield General Infirmary, &c.—Sen. H.S., at rate of £180.

Manchester, Booth Hall Hosp. for Children.—Deputy Med. Supt., £550.

Manchester City.—M.O. for Maternity and Child Welfare, £600.

Manchester, Royal Children's Hosp., Pendlebury.—Res. Surg. O., at rate of £150.

Manchester Royal Infirmary.—Jun. Asst. M.O., £350.

Middlesbrough, North Riding Infirmary.—Cas. O., £150.

Ministry of Health, Whitehall, S.W.—Temp. Serologist, at rate of £850.

Nelson Hosp., Merton, S.W.—Res. H.S., at rate of £100.

Newark General Hosp.—Res. H.S., £175.

Newcastle-on-Tyne, Wooley Sanatorium, near Hexham.—Asst. M.O., £350.
Norwich, Norfolk and Norwich Hosp.—H.S. to Spec. Depts., £160.
Nottingham General Dispensary, Hyson Green Branch.—Res. Surgeon, £300.
Nottingham General Hosp.—Res. Cas. O. and H.S., each at rate of £150.
Oldham, Boundary Park Municipal Hosp.—Res. A.M.O., at rate of £200.
Oxford, Wingfield-Morris Orthopædic Hosp., Headington.—Res. H.S., £100.
Plymouth, Prince of Wales's Hosp., Devonport.—Jun. H.S., at rate of £120.
Prince of Wales's General Hosp., N.—Hon. Clin. Asst.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—Hon. Radiologist.
Queen's Hospital for Children, Hackney-road, E.—H.S., at rate of £100.
Radium Institute, Riding House-street, W.—Res. M.O., at rate of £250.
Royal Chest Hosp., City-road, E.C.—Res. M.O., at rate of £150. Also H.P., at rate of £100.
Royal Free Hosp., Gray's Inn-road, W.C.—Asst. Physician to Dept. of Physical Medicine. Also First Asst. in Children's Dept., at rate of £100.
Royal London Ophthalmic Hosp., City-road, E.C.—Out-patient Officer, £100.
Royal Naval Medical Service.—M.O.'s.
St. Alban's and Mid-Herts Hosp.—Res. H.S., £150.
St. Helen's County Borough.—Asst. M.O.H., £500.
St. Thomas's Hosp., S.E.—Asst. Pathologist, £450.
Salisbury General Infirmary.—H.P., at rate of £125.
Seamen's Christian Friend Society Hospital Trust.—Asst. Med. Supt. for Hosp. in Mediterranean.
Sheffield Children's Hospital.—H.S., at rate of £100.
Sheffield Royal Hosp.—H.S. to Ear, Nose, and Throat Dept., at rate of £80.
Shrewsbury, Royal Salop Infirmary.—Res. H.P., at rate of £160.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Hon. Anæsthetist.
Stourbridge, Wordsley Public Assistance Institution.—Res. Asst. M.O., £250.
Sunderland Royal Infirmary.—Two H.S.'s, each £120.
Swansea, Adelina Patti Hosp.—H.P., at rate of £150.
Swansea County Borough Mental Hosp.—Asst. M.O., £350.
Swansea General and Eye Hosp.—Cas. O., at rate of £150–£175.
Taunton and Somerset Hosp.—H.S., at rate of £100.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. to Ear, Nose, and Throat and Ophth. Depts., £150.
Victoria Hosp. for Children, Tite-street, S.W.—Cas. O., at rate of £200.
Walsall General Hosp.—H.P. and Res. Asst. Pathologist, at rate of £150.
West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Psychotherapist. Also Hon. Clin. Asst. for Out-patient Dept.
Westminster Hosp., Broad Sanctuary, S.W.—Asst. M.O. in X Ray and Electrical Dept.
Whitechapel Clinic, Turner-street, E.—Asst. Pathologist, £500.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.
Woolwich and District War Memorial Hosp., Shooter's Hill, S.E.—H.P. and H.S., each at rate of £100.
Worcester Royal Infirmary.—H.S. to Gynæcological Dept., £140. Also Locum Jun. H.S., £5 5*s.* weekly.
York County Hosp.—H.S. to Eye, Ear, Nose, and Throat Dept., £150.
York Dispensary.—Res. M.O., £175.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Youlgreave (Derbyshire) and Fauldhouse (West Lothian).

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, April 20th.
General Meeting of Fellows. 5.30 P.M. Ballot for election to the Fellowship.

THURSDAY.
Neurology. 8.30 P.M. Pathological Meeting.
Urology. 10 A.M. Annual General Meeting. Mr. Clifford Morson: The Harris Operation and its Modifications. 11.30 A.M. Mr. Kenneth Walker: Trans-urethral Operations on the Prostate Gland. 2.30 P.M. Demonstration of museum specimens and report of experimental urinary work at the Royal College of Surgeons.

FRIDAY.
Urology. 10.15 A.M. Sir John Thomson-Walker: The Bladder in Spinal Injuries in War. Prof. G. Grey Turner: The Place of Surgery in the Undescended Testicle. 2.30 P.M. Operations and demonstrations at All Saints' Hospital, St. Paul's Hospital, St. Peter's Hospital, Middlesex Hospital, and King's College Hospital.
Disease in Children. 5 P.M. (Cases at 4.30 P.M.) Cases which have previously appeared before the section will be shown.

MEDICO-LEGAL SOCIETY.
THURSDAY, April 22nd.—8.30 P.M. (26, Portland-place, W.), Dr. G. Roche Lynch, Dr. D. Harley, and Mr. D. Harcourt Kitchin: The Medico-legal Importance of the Blood Groups with Special Reference to Non-paternity.

CHELSEA CLINICAL SOCIETY.
TUESDAY, April 20th.—8.30 P.M. (Hotel Rembrandt, Thurloe-place, S.W.), Mr. E. Rock Carling: The Doctor and His Dependants.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF BIRMINGHAM.
THURSDAY, April 22nd.—4 P.M., Prof. W. N. Haworth, D.Sc., F.R.S.: The Chemistry of the Carbohydrates: Ascorbic Acid and other Water-soluble Vitamins. (William Withering lecture.)

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, April 19th.—2.30 P.M., Dr. C. W. Buckley: Arthritis.
WEDNESDAY.—2.30 P.M., Dr. J. Vaughan: Sedimentation-rate. 3 P.M., clinical and pathological conference (surgical). 4 P.M., Mr. J. E. H. Roberts: Surgery of the Chest. 4.30 P.M., Dr. W. E. Gye: Experimental Cancer Research.
THURSDAY.—Noon, clinical and pathological conference (obstetrical and gynæcological). 2.30 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. A. K. Henry: Demonstrations of the Cadaver of Surgical Exposures. 3.30 P.M., Mr. Malcolm Donaldson: Radiation Therapy in Gynæcology.
FRIDAY.—2 P.M., operative obstetrics. 3 P.M., clinical and pathological conference (medical).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, April 19th.—10 A.M., Dr. Post: X Ray Film Demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Green-Armytage: Endometrioma.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Mr. Woodd Walker: Adhesions around Joints.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Mr. Hasler: Pre-anæsthetic Medication.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, and genito-urinary and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics.
SATURDAY.—10 A.M., children's and surgical clinic. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, April 19th, to SUNDAY, April 25th.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. All-day course in neurology.—INFANTS HOSPITAL, Vincent-square, S.W. Sat. and Sun., course in infants' diseases.—ROYAL CANCER HOSPITAL, Fulham-road, S.W. Sat. and Sun., course in cancer.—Courses are open only to members of the Fellowship.

TAVISTOCK CLINIC, Malet-place, W.C.
TUESDAY, April 20th.—8.30 P.M., Prof. E. Kretschmer: Heredity and Constitution in the Ætiology of Psychic Disorders.
WEDNESDAY.—8.30 P.M., Prof. Kretschmer: The Structure of the Personality in relation to Psychotherapy.
THURSDAY.—8.30 P.M., Prof. Kretschmer: Instinct and Hysteria.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
TUESDAY, April 20th.—5.30 P.M., Dr. B. T. Parsons-Smith: Right Heart Failure.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, April 22nd.—2 P.M., Sir Lancelot Barrington-Ward: Developmental Abnormalities of the Mesentery and Gut. 3 P.M., Dr. Bertram Shires: Skiagraphic Appearances in Rickets, Scurvy, &c.
Out-patient Clinics daily at 10 A.M. and Ward Visits at 2 P.M.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, 42, Ranelagh-road, S.W.
FRIDAY, April 23rd.—4.30 P.M. (St. Stephen's Hospital), Demonstration of various methods of physical treatment.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, April 20th.—4.15 P.M., Mr. Geoffrey Jefferson: Surgery of Intracranial Aneurysms.
FRIDAY.—4.15 P.M., Dr. Crighton Bramwell: Demonstration of Medical Cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, April 21st.—4.15 P.M. (Western Infirmary), Dr. J. G. Macgregor-Robertson: Venereal Disease in Men.

NOTES, COMMENTS, AND ABSTRACTS

BLOOD PRESSURE AMONGST ABORIGINAL ETHNIC GROUPS OF SZECHWAN PROVINCE, WEST CHINA

BY W. R. MORSE, M.D. McGill, LL.D., F.A.C.S.

DIRECTOR OF THE COLLEGE OF MEDICINE AND DENTISTRY AND HEAD OF THE DEPARTMENT OF ANATOMY, UNION UNIVERSITY, CHENGTU, WEST CHINA; AND

Y. T. BEH, M.D.

INSTRUCTOR IN ANATOMY AT THE UNIVERSITY

THE blood pressure plays an important part in anthropology in relation to heredity, environment, social life, diet, attitude, stress and strain of ethnic groups. Publications dealing with the blood pressure of little known and isolated ethnic groups are probably not very extensive. Here is a report on three such groups, the Chwan Miao, the Ta Hwa Miao, and Noso (Lolo).

Ten expeditions * have been made by the senior author amongst the aboriginal ethnic groups of the borderlands of the above province to secure anthropological data. The blood pressure of the Chwan Miao was taken by Y. T. Beh and that of the Ta Hwa Miao and the Noso by Dr. L. G. Kilborn, professor of physiology. Physical anthropological measurements and observations were made on the above groups. Photographs were taken, but in only one group (the Chwan Miao) do the photographs indicate the individuals on whom the blood pressure and the other anthropological measurements and observations were taken.

All of these aboriginal groups are relegated by the pressure of the Chinese to the fastnesses of the mountains of the provinces. The Chwan Miao are found in Szechwan and Kweicheo; the Ta Hwa Miao chiefly in Yunnan and Kweicheo; the Noso in Szechwan, Yunnan, and Kweicheo.

Method.—A Nicholson's mercury, or a Tycos sphygmomanometer was used. The subjects were seated facing the experimeter, and a 12 cm. cuff was applied to the right arm of the subject. The pressure in the cuff was raised until all sounds had disappeared, and then as the pressure in the system was lowered the first point at which sounds reappeared was recorded as the systolic blood pressure. As the pressure was still further lowered the point at which the clear sounds suddenly changed to dull and muffled ones (so-called fourth point) was recorded as the diastolic pressure. Readings were made at various times of the day as they had to be taken whenever the subjects were available.

The recording of the blood pressure was but one item in a series of complete anthropological measurements carried out by members of our expedition into the Miao country.

The results on the Chwan Miao are set out in Table I.

Table II shows the results on the Ta Hwa Miao and the results on the Noso (Lolo) are given in Table III.

TABLE I

Blood Pressure of the Chwan Miao

Age-group.	Number examined.	Systolic pressure.			Diastolic pressure.			Pulse pressure.		
		Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
16–20	3	103·5	110	94	69·7	81	58	32·3	36	29
21–25	35	111·9	130	90	71·4	81	54	41·9	61	22
26–30	34	108·1	130	90	69·7	91	50	39·2	65	20
31–35	13	106·2	120	90	71·9	90	55	37·5	55	20
36–40	21	107·3	128	86	71·1	85	60	37·0	59	20
41–45	15	107·9	120	92	72·1	85	40	40·6	62	25
46–50	10	107·1	130	86	74·7	81	60	37·2	61	18
51–55	4	119·5	120	118	77·5	90	70	42·0	50	28
56–60	4	113·0	140	100	73·8	92	65	39·8	48	35
61–65	2	106·5	108	105	70·0	..	..	36·5	38	35
66–70	2	116·0	130	102	72·0	78	66	44·0	52	36
Total	143	..	..	..	..	..	..	..	..	..
Aver.	..	109·7	..	..	72·1	..	..	38·9	..	..

Systolic pressure.	Diastolic pressure.	Pulse pressure.
Number 140	Number 140	Number 140
Range .. 85–140	Range .. 40–93	Range .. 18–65
Age .. 21–70	Age .. 21–70	Age .. 21–70
M = 107·37 ± 0·59	M = 70·56 ± 0·45	M = 37·84 ± 0·58
σ = 10·37 ± 0·43	σ = 7·89 ± 0·32	σ = 10·15 ± 0·41
V = 9·67 ± 0·39	V = 11·18 ± 0·45	V = 26·82 ± 1·08

TABLE II

Blood Pressure of the Ta Hwa Miao

Age-group.	Number examined.	Systolic pressure.			Diastolic pressure.			Pulse pressure.		
		Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
16–20	17	108	124	78	70	90	40	38	59	25
21–25	26	106	122	92	68	87	54	37	58	26
26–30	22	109	134	82	76	88	64	35	52	15
31–35	21	106	123	92	70	90	60	36	56	24
36–40	22	103	122	85	72	82	58	32	44	25
41–45	12	100	114	86	71	83	58	29	38	16
46–50	16	99	118	78	68	90	55	30	47	12
51–70	14	100	108	78	73	75	52	32	42	23
Total	150	..	..	..	..	..	..	..	..	..
Aver.	..	104	..	..	70	..	..	34	..	..

TABLE III

Blood Pressure of the Noso

16–20	6	98·6	106	90	66·1	78	45	32·1	51	22
21–25	33	104·7	128	90	73·2	95	58	31·4	57	20
26–30	26	107·7	124	86	73·3	90	58	34·4	46	26
31–35	9	102·7	130	86	73·4	88	56	29·3	42	22
36–40	14	101·8	118	90	71·6	90	55	31·4	42	20
41–45	6	106·3	123	97	77·3	90	66	30·7	45	17
46–50	4	106·2	127	90	73·2	90	63	33·0	37	27
51–60	6	99·6	122	78	73·8	90	53	25·8	42	15
64	1	118·0	..	..	72·0	..	..	46·0	..	..
Total	105	..	..	..	..	..	..	..	..	..
Aver.	..	104·5	..	..	72·8	..	..	31·7	..	..

The blood pressure of these three groups is uniformly low, the Chwan Miao being somewhat the highest. There is no tendency towards an increase in the blood pressure with age.

All these people live in the mountains above sea level, the Chwan Miao at or about 3000 ft., the Ta Hwa Miao at 7–9000 ft., and the Noso at 5–10,000 ft. They all live in a fairly rigorous climatic environment not subject to extremes of temperature. The location of these groups is approximately Lat. 28°–31° N. and Long. 100°–104°, this section being in parts of Szechwan, Yunnan, and Kweichow provinces. None of these groups live in villages or cities but they are scattered about the countryside. They are agricultural and pastoral people; some are hunters.

In all cases the chief diet of these mountaineers is corn and not too abundant in amount; the Chwan

* These ten expeditions embraced the following groups—viz., Tibetan, Chiang, Gia Rong, Noso (Lolo) Black and White Bones, Hsi Fan, Bo Lo Tsi, Ta Hwa Miao, Chwan Miao, and Chung Chia. Of these groups some 1306 individuals have been measured and observed, but the statistical results have not been fully worked out.

Miao eat some rice. Meat is not used as a general diet, being almost entirely limited to weddings, funerals, and celebrations. Milk, butter, and cheese are not used in either group. Vegetables are sparsely eaten. They live on a restricted low diet. The sexual life of the Miao groups is rather free amongst themselves, except the Christians. The Noso are not sexually free.

These groups are relatively isolated from the Chinese, especially the Independent Noso of Szechwan. The Miao groups are not so isolated. They are living where might is right. All have been and the Noso now are very antagonistic with the Chinese. The Miao, formerly very warlike, are now subdued. The Ta Hwa Miao are practically serfs of the Noso.

SUMMARY

This paper reports the blood pressure of three ethnic groups as follows :—

TABLE IV

Group.	Number.	Age.	Systolic pressure.	Diastolic pressure.	Pulse pressure.
			Mean.	Mean.	Mean.
Chwan Miao ..	143	16–70	109·7	72·1	38·9
Ta Hwa Miao .	150	16–70	104·0	70·0	34·0
Noso (Lolo) ..	105	16–64	104·5	72·8	31·7

The blood pressure of the Noso and Ta Hwa Miao does not increase with age and the Chwan Miao only slightly so.

REFERENCES

Kilborn, L. G. (1933) Blood Pressure of a Primitive Race, *Chin. med. J.* Suppl. March, pp. 29–34.

— (1936) A Note on the Blood Pressure of a Primitive Race, with special reference to the Miao of Kweichow, *Chin. J. Physiol.*

AIR-RAID PRECAUTIONS AT PUBLIC SCHOOLS

MEMBERS of the Medical Officers of Schools Association met together on April 9th, under the presidency of Dr. J. LAMBERT, to hear an address from Dr. STUART BLACKMORE, of the air-raid precautions department of the Home Office. Dr. Blackmore put before them the problem set by air attack and asked for suggestions as to how it should be solved by those in charge of schools. Of the three kinds of missile to be expected the first, the high-explosive bomb, was so powerful that the effects of a direct hit might be left out of account in devising preventive measures. The damage done by splintering and by the pulse-wave following the explosion could, however, be minimised. The gravest danger was from the incendiary bomb, which produced a temperature of 2000° C., and was inextinguishable. From the fire-fighting point of view, it would be useless to direct energy to using water or chemicals on the point of contact or the bomb, and they must be employed on the surroundings to limit the extent of the fire. Dr. Blackmore placed the gas bomb last because it was the least dangerous of the three forms of air attack, if only the mass of the people could be given the necessary minimum of instruction and training. Gas, if used against an unprotected and ignorant populace, was absolutely devastating, both in producing casualties and in ruining morale ; but against an instructed mass of people its effects were less to be feared than those of the high explosive and the incendiary bomb.

It was agreed that each public school should make suggestions suitable to its own circumstances and situation.

PROTECTION OF MOTHERS AND CHILDREN IN RUSSIA

BEFORE the war infant mortality in Russia was about 270 per 1000 live births, and in 1914 a third of all deaths in Moscow were estimated to be among children under five. Immediately after the Revolution a department for the protection of motherhood and infancy was set up, and the comprehensive service it has instituted is described and illustrated in a book entitled "Nursery School and Parent Education in Soviet Russia."[1] According to the authors, the State takes entire responsibility for protecting its women and children and, though at present the standard varies greatly between towns and country districts, the ultimate aim is to provide adequate intelligent care in nursery institutions for every young child in the Union. A woman engaged in physical work is now entitled to eight weeks' leave before and eight weeks after confinement, with full wages, and the nursing mother may take half an hour after every three and a half hours of work to feed and attend to her baby. Consultation centres cater both for mothers and children, and the doctor in charge of a centre is held responsible for certain streets, where he must visit any infants who are seriously ill, besides those suffering from infectious illness. Creches are of different types according to the mother's occupation. A factory worker takes her baby to the creche attached to her place of work, to remain there as long as she is on duty. Many women are employed on collective farms, and summer travelling creches follow them round from place to place, the babies being kept for as many as eighteen hours a day when necessary. Travelling in Russia is notoriously slow, but it is enlivened for mothers and infants by the establishment of special rooms with nursery equipment at the larger railway stations. A mother with a child is expected and encouraged to break into the queue when waiting to take tickets, and on some trains special coaches for mothers and children are provided.

Nursery schools only cater for children up to the age of four, but they have a strong political bias. An account of one school shows babies of fourteen months playing in a room with a portrait of Lenin for their inspiration ; from infancy "the air of education is collectivism," teachers being instructed to think out every part of the apparatus and play-material "in the light of the educational goals of the State." Furniture and equipment are carefully designed, and the toys are exceptionally good, many being made by peasants from the simplest materials. Probably at times both teachers and children forget that their institution is "a principal weapon in the struggle for socialism in the nursery field," and play, like anybody else, just for the fun of the thing.

Education of parents is carried on by parent-teacher meetings, by exhibitions, temporary and permanent, by literature and posters. Research departments are working in Moscow and Leningrad, studying both normal and abnormal children under three years of age, and special attention is devoted to the training of deaf and dumb children.

E. MERCK'S JUBILEE REPORT

IT was in January, 1887, that the chemical works of E. Merck in Darmstadt began to issue a summary of "short and useful informations" about new pharmaceutical preparations for the use of doctors and pharmacists. It was not the firm's first venture of the kind because Heinrich Emanuel Merck (1794–1855), whose portrait is attached to the jubilee issue now before us, had already embarked on a serial entitled "A Cabinet of Novelties" and had collaborated with Liebig, Trommsdorf, and Mohr

[1] By Vera Fediaevsky, formerly Senior Scientific Worker of the Central Institute for the Protection of Motherhood and Infancy, in collaboration with Patty Smith Hill, Professor Emeritus of Education, Columbia University, New York. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1936. Pp. 265. 10*s.* 6*d.*

in the Annals of Pharmacy. For half a century the Jahresbericht has appeared, giving what its editor regards as the "really important" in the pharmaceutical year. The report has contained original articles from the firm's own laboratories and often contributions from outside authors, of which one of the earliest was J. v. Mering's "Physiological and Therapeutic Investigations on the Action of some Morphine Derivatives." The present volume is prefaced by congratulatory notes from directors of pharmacological institutes all over the world including Heubner (Berlin), Tschirch (Bern), Krehl (Heidelberg), Hansen (Oslo), Aschoff (Freiburg), Marinesco (Bucharest), Eppinger (Vienna), Barger (Edinburgh), Cesa-Bianchi (Milan), Tsi-Lung (Shanghai), Crocco (Buenos Aires), Lebeau and Tiffeneau (Paris). The next 170 pages contain original contributions dealing for the most part with hormones, vitamins, and the newer alkaloids, leaving 120 pages for brief summaries of some 600 preparations and drugs, with precise references to the literature. Merck has not been unmindful of foreign readers, for French, Russian, Spanish, and English editions of their annual report have appeared for many years. A general index of all 50 numbers is promised in the near future.

PALLIATIVE TREATMENT OF CANCER

A PLEA for a different mental attitude towards methods of treating cancer is made by Dr. B. R. Shore.[1] His thesis is that to prolong life with the greatest possible measure of physical and mental comfort is the goal in treating all chronic non-infectious diseases, including cancer. Shore holds that the modern practice of classifying treated cases of malignant disease as three-, five-, or ten-year "cures" is unfair to existing therapeutic methods which should also be credited with the vast measure of physical and mental relief afforded to patients who do not survive long enough to fall within any category of "cure." The biology of any given cancer and of the patient suffering from it are two unknown quantities; no patient is too ill for therapy in some form and the prognosis is often quite uncertain. To illustrate his point the author quotes six cases of apparently inoperable carcinoma of breast on whom palliative mastectomy followed by radiation was done. Three of the six are still alive without recurrence 8 years later; one died of recurrence after 7 years and another after 6 years, and one died of heart disease 7 years after operation. The importance of histological diagnosis in cases of cancer is emphasised. It is a counsel of perfection that biopsy specimens should be of adequate size and taken from representative portions of the growth by gentle surgical means. Gynæcologists might ask whether curettings from a case of suspected carcinoma of the body of the uterus may be regarded as adequate biological material; it would be difficult to obtain larger portions of material in such cases without resorting to laparotomy. A disturbing fact disclosed by an investigation of 744 consecutive cancer cases admitted to St. Luke's Hospital, New York, to which Dr. Shore is attached was that only 24·4 per cent. were radically operable. In a group of 255 private patients, 53 per cent. were radically operable, a proportion considerably higher though still falling far short of perfection. Making due allowance for other factors, the conclusion is reached that cancer is detected earlier among the better-to-do patients. This is what one would expect.

Prof. A. E. NAISH writes: "My attention has been called to recent articles in the provincial lay press in which it is stated that a research group is working at Sheffield University under my direction investigating the treatment of hæmophilia. I wish to state most emphatically that these articles have been published without my knowledge, and that, although I have been associated with the work, it is not being done under my direction."

[1] *Ann. Surg.* March, 1937, p. 442.

Births, Marriages, and Deaths

BIRTHS

BEVAN.—On April 9th, at Devonshire-place, W., the wife of Dr. Charles E. Bevan, Colonial Medical Service, Cyprus, of a son.

GRANT NICOL.—On April 8th, at Wimbledon, the wife of Dr. C. Grant Nicol, of a daughter.

LIST.—On March 31st, the wife of Dr. H. M. List, of Rochdale, of a son.

MCKIBBIN.—On April 9th, at Blackheath, the wife of Major F. McKibbin, R.A.M.C., of a son.

NEWTON PRICE.—On April 11th, at Hove, the wife of Dr. E. Newton Price, of a son.

O'CONNOR.—On April 8th, the wife of Dr. W. J. O'Connor, High Wycombe, of a daughter.

PATERSON.—On April 4th, at Portsmouth, the wife of Dr. Gerald Paterson, of a daughter.

PORTER.—On April 7th, at Faversham, the wife of Dr. T. W. Herdman Porter, of a son.

THURSTON.—On April 8th, the wife of Dr. Gavin Thurston, of Clapham Common, of a son.

WATERS.—On April 6th, the wife of Captain H. S. Waters, I.M.S., Presidency Surgeon, Bombay, of a daughter.

WHITE.—On April 13th, at Belsize Park-gardens, N.W., to Sylvia, wife of Norman White, F.R.C.S.—a son.

WRIGLEY.—On April 8th, at Hamilton-terrace, N.W., the wife of Arthur Joseph Wrigley, M.D. Lond., F.R.C.S. Eng., of a son.

MARRIAGES

GREGERSON—CAMPBELL.—On April 10th, at Christ Church, Westminster, Dr. Gerald J. Gregerson, of Adelaide, S. Australia, to Sheila, elder daughter of Mr. and Mrs. W. R. Campbell, of Sydney, N.S.W.

WHITFIELD—DENCE.—On April 3rd, at St. Mark's Church, Torquay, George J. Newbold Whitfield, of Sunderland, to Audrey Priscilla Dence, M.B. Lond., daughter of the late Rev. A. T. Dence, formerly of Abbotskerswell, and Mrs. Dence, Torquay.

DEATHS

BURTON.—On April 6th, at Clifton-court, N.W., Alfred Henry Burton, M.D., of Laxfield House, Suffolk, aged 84.

GUTHRIE.—On April 13th, at Wimbledon, Robert Lyall Guthrie, O.B.E., M.D., C.M. Edin., Lt.-Col., R.A.M.C. (T.), Barrister-at-Law, Coroner, Eastern District, County of London.

JACKSON.—On April 5th, John Luke Jackson, M.B., B.Ch. Belf., son of the late Rev. John Jackson, D.D., Ballycastle.

LEAK.—On April 10th, at Winsford, Cheshire, Hector Leak, M.R.C.S. Eng., in his 81st year.

MURPHY.—On April 6th, at Liphook, Hants, William Murphy, M.B. Edin., in his 83rd year.

PECK.—On April 5th, at Bridgnorth, Salop, Awdry Peck, M.A. Oxon., M.R.C.S. Eng., aged 89.

SMART.—On April 7th, at Liverpool, David Smart, M.B. Edin., V.D., Colonel, A.M.S.T., for 35 years Medical Officer in charge Smithdown-road Hospital, Liverpool.

TIGHE.—On April 4th, at Castlerea, Co. Roscommon, Ireland, J. W. Tighe, L.R.C.P.I. & L.M., Surgeon-Commander, Royal Navy (retd.), only son of Dr. J. M. Tighe, and the late Mrs. Tighe, of Melbourne.

TURNBULL.—On April 11th, at Southsea, following an operation, Surgeon-Captain Hugh Prideaux Turnbull, R.N. (retd.), of Emsworth.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

A CONFERENCE ON PROSTITUTION.—The French Government has introduced a Bill to abolish *maisons tolérées* and to organise the fight against venereal diseases. The International Abolitionist Federation is taking the opportunity to organise an international congress in Paris from May 20th to 22nd. The problems of prostitution and venereal disease will be studied during this congress from three points of view—legal, medical, and moral. Dr. Veldhuyzen, director of the Wilhelmine Hospital at Amsterdam, who will open the discussion on the medical aspect, will describe the progress in treating venereal diseases and explain why voluntary methods of treatment have proved more successful than compulsory methods. Miss Alison Neilans, general secretary of the Association for Moral and Social Hygiene, will deal with the effect of regulation on morality, youth, and the women concerned. Information about the congress may be had from the Secretariat of the Federation, 8 rue de l'Hôtel-de-Ville, Geneva.